Kew Bulletin

PUBLISHED FOR THE ROYAL BOTANIC GARDENS, KEW

FORMERLY THE "BULLETIN OF MISCELLANEOUS INFORMATION"

No. 1, 1958

Review of the work of the Royal Botanic Gardens, Kew, during 1957

General

The Director, as Biological General Secretary of the British Association for the Advancement of Science, attended the Annual Meeting in Dublin from 3rd to 11th September. He also attended the meeting of the French Association (L'Association Française pour l'Avancement des Sciences) at Perigueux in July. As a member of the Managing Committee of the Arnold Arboretum he attended a meeting of the Committee in Boston, U.S.A., from 5th to 14th December. Dr. Turrill and Messrs. Ballard and Hubbard also attended the meeting of the British Association in Dublin.

Dr. W. B. Turrill, O.B.E., F.R.S., V.M.H., retired on 1st October, from the post of Keeper of the Herbarium after a total service of 49 years, of which 12 years were spent as Keeper. He was succeeded as Keeper by Mr. C. E. Hubbard, O.B.E.

Dr. N. L. Bor, the Assistant Director, was appointed an Officer of the Order of the British Empire in the Birthday Honours for 1957.

Mr. W. M. Campbell, the Curator, was awarded the Victoria Medal of Honour by the Royal Horticultural Society.

The need for a new wing to the Herbarium to house the Library and to take the overflow of specimens for the three existing wings, is becoming an urgent problem. Library space is so cramped that many periodicals have to be laid on top of the bound volumes.

The annual 'Open Day' was held on the 4th May and several hundred students, teachers, members of scientific institutions, etc., were conducted round the Gardens, Museum, Jodrell Laboratory, Herbarium and Library.

Herbarium

During the past year, the Herbarium has been considerably enriched by extensive and carefully prepared collections from most parts of the world, particularly from tropical Africa. The number of specimens received, 57,034, although smaller than in 1956 (63,413), was made up of a greater variety of dried and spirit material, comprising 53,026 specimens presented and 4,008 purchased. Of the 65,511 specimens mounted and for the greater part incorporated in the Herbarium, over one third (22,866) were from tropical Africa, indicative of the very active interest of the staff in the botanical investigation of that region: these figures exclude *Bryophyta*, *Algae*, *Lichenes* and *Fungi*. It has been difficult to meet the many requests for duplicates, but 13,273 specimens were distributed to other herbaria. In connection with various monographic and floristic studies at Kew, 15,375 specimens were borrowed for examination, mainly for use in the preparation of the three African regional floras, whilst 5,721 were lent to other botanical institutions. The number of enquiries dealt with by correspondence, totalling close on 3,000, is nearly 500 greater than in 1956, and reflected in the wide range of subject matter an increasing interest by the general public in both wild and cultivated plants, as well as in botanical problems generally.

Mr. L. L. Forman returned from the Bogor Herbarium in March after spending thirteen months in Indonesia, where he gained valuable experience in the field, and made extensive collections in E. Java, N.E. Celebes and E. Borneo. Mr. F. N. Hepper left Kew in September on a botanical collecting expedition to the northern part of the British Cameroons.

Mr. D. J. B. Killick, the South African Liaison Officer at Kew, returned to the National Herbarium, Pretoria in May, being replaced by Mr. W. Marais of the same Institution.

There have been a number of changes in the staff, especially in those engaged by the Colonial Office for work on the African floras in preparation at Kew. Mr. J. Lewis resigned his appointment in January to join the staff of the British Museum (Natural History); Mr. J. H. Hemsley left Kew near the end of 1956 to take up an appointment with the Nature Conservancy; Mrs. K. Munday (Miss J. Elffers) also resigned. As a result, the "Flora of Tropical East Africa" team lost the services of three competent botanists. For most of the year these posts remained vacant but two of them were filled in the last quarter by the appointment of Mr. C. Jeffery as a Scientific Officer and of Miss S. Carter as an Assistant Experimental Officer. Dr. H. Huber was engaged in October as a Scientific Officer to work on the revision of the "Flora of West Tropical Africa", under Mr. F. N. Hepper. Miss B. Willoughby has been appointed an Assistant Experimental Officer in the Australasian Section.

Mr. R. D. Meikle continued his work on the "Flora of Cyprus", having completed *Cruciferae*, the fifth in order of magnitude of the six large families in the flora of the island.

Arrangements are being made for the preparation of an illustrated "Flora of 'Iraq" as a separate publication on behalf of and financed by the Government of 'Iraq. The taxonomic part of this work is being prepared mainly at Kew by Mr. R. A. Blakelock; the ecological and economic data are being provided by Dr. Ali al-Rawi and his colleagues at the National Herbarium of 'Iraq, at Abu Ghraib Farm, Baghdad. In addition to field-work and collect-

ing, Mr. E. R. Guest has provided drafts of a proposed physiographic division of the country, notes on the economic botany and many valuable suggestions on the scope of the Flora. Treatment of certain families and genera is being undertaken by Prof. K. H. Rechinger, Vienna. Mr. M. J. S. Sands has commenced work as an Assistant (Scientific) at Kew in connection with the Flora, and a start has been made on the illustrations, which are being drawn by Miss L. Ripley.

Mr. R. A. Blakelock has published part III of "Notes on the Flora of 'Iraq with keys" (*Caryophyllaceae*, including *Illecebraceae*; *Dianthus* by Miss S. S. Hooper). Part IV of this series of papers is now in the press.

The work of the Tropical African Section has again been concentrated on the preparation of the "Flora of Tropical East Africa". Only one part has been published during the year, namely *Orobanchaceae*, but three other parts are in the press.

Mr. J. B. Gillett and Mr. E. Milne-Redhead have continued to work on the *Papilionoideae* and Mr. J. P. M. Brenan finished his account of the *Mimosoideae*, which will soon be going to press, and has made a start on the genus *Cassia*. Mr. J. Lewis has finished off the *Loganiaceae* which had been started by the late Miss E. A. Bruce. Mr. R. A. Graham has completed his account of *Rosaceae* and Mr. P. Taylor that of *Primulaceae*. Mr. R. A. Blakelock's account of the *Celastraceae* and Miss J. Elffers' account of *Resedaceae* are now being prepared for press whilst accounts of the *Melianthaceae* and *Convolvulaceae* have been submitted by Dr. B. Verdcourt of the East African Herbarium. Several other parts are in various stages of preparation.

Work on the revised edition of the "Flora of West Tropical Africa" has slowed down considerably during the year. Mr. R. W. J. Keay returned to Nigeria at the end of March to take up the duties of Principal Research Officer in the Federal Department of Forest Research, and the preparation of the new edition of the Flora will be continued by Mr. Hepper and Dr. Huber. Unfortunately, publication of the second part of Vol. 1 and the Supplement covering the Ferns and Fern Allies has been unavoidably delayed.

Dr. H. Wild, Senior Botanist to the Ministry of Agriculture, Federation of Rhodesia and Nyasaland, and Dr. N. Robson, continued with their work on "Flora Zambesiaca", spending much of their time in the Kew Herbarium.

During September the Third Plenary Meeting of A.E.T.F.A.T. was held in Paris and was attended by Mr. J. P. M. Brenan, Mr. J. B. Gillett, Mr. E. Milne-Redhead, Dr. N. Robson and Dr. H. Wild. Mr. Brenan has continued to act as A.E.T.F.A.T. Librarian during the year but, as decided at the Paris Meeting, he is handing over this task to Professor P. Duvigneaud (at Brussels University), who is the compiler of the "A.E.T.F.A.T. Index". This valuable work of reference continues to be published and to assist workers on the tropical African flora.

Mr. Reid officially attended and assisted to organise the Spring Foray of the British Mycological Society at Porlock, and led the autumn fungus forays of the Bedfordshire Natural History Society (Deadmansea Wood), London Natural History Society (Burnham Beeches) and Hertfordshire Natural History Society (Frithsden Beeches, Berkhamsted).

Mr. C. E. Hubbard continued to serve on the "Advisory Committee on Research designed to improve Sea Defences ".

The number of botanists studying in the Herbarium and Library continues to increase, and their 5,647 visits are over 1,000 more than in 1956 (4,455). Many of the visitors were from overseas, the countries of the British Commonwealth being particularly well represented, and we have been glad to welcome many old friends from botanical establishments.

Up to a short time before his death on 29th October, at the age of 90, Mr. W. C. Worsdell continued his generous assistance to all seeking translations from West European languages, and many are grateful for his help. As in previous years, Miss M. M. Whiting worked voluntarily for some months on the Asiatic collections, giving much appreciated assistance. Dr. J. Hutchinson has continued the preparation of his "Genera Plantarum", whilst the new edition of his "Families of Flowering Plants" is now being printed. Since his retirement Dr. W. B. Turrill has paid almost daily visits to the Herbarium in connection with his various monographic and other studies. Miss Ross-Craig has continued the preparation of her "Drawings of British Plants", part X (*Saxifragaceae* and *Crassulaceae*) being published during the year, and part XI (*Droseraceae* and *Ficoidaceae*) being in the press. Throughout the year Mr. S. A. Ali of the Department of Botany, Karachi, has studied Pakistan *Leguminosae*, whilst in August Dr. Z. U. Syed of the Punjab University, Lahore, started work at Kew under the auspices of the British Council, on Pakistan plants, with special reference to the *Compositae*. Dr. J. Lorch of the Hebrew University, Jerusalem, came to Kew in October as a British Council Scholar, to study Western Asiatic *Gramineae*. Mrs. C. Heyn, of the same University, was here for a considerable period, engaged on a study of the annual species of *Medicago*. Two more British Council Scholars, Dr. Humberto A. Fabris of the Museo de la Plata and Dr. Dárdano de A. Lima of I.P.A., Recife, Pernambuco, were studying at Kew for a large part of the year and left in August. Mr. G. Brownlie of the University of Canterbury, New Zealand, spent several months working on the systematics of New Zealand ferns. Dr. N. H. Brittan of the University of Western Australia, arrived in March and devoted the remainder of the year to a monographic study of the genus *Thysanotus*. Miss A. Denly, Curator-Designate of the Moss Herbarium, University of Johannesburg, worked at Kew for some months in preparation for taking up her new duties. Miss J. Dingley of the Department of Scientific and Industrial Research, New Zealand, and Mr. J. E. C. Aberdeen of the University of Queensland spent several months studying *Hypocreaceae* and Australian *Agaricales* respectively. During the early part of the year, Mr. B. Beshir, Technical Officer of the Section of Botany and Plant Pathology of the Sudan Ministry of Agriculture, continued to gain experience by working in the Kew Herbarium where his help was greatly appreciated.

Dr. W. B. Turrill has continued as editor of the Botanical Magazine, parts 3 and 4 of volume 171, being published on 1st April and 1st October respectively; twenty of the twenty-two articles were written by members of the staff. The illustrations and specimens used have been presented to Kew by the Royal Horticultural Society.

As in previous years a successful and well-attended series of lectures, on the vegetation of various countries overseas, was given by visitors and members of the Staff.

An infestation by the Drug Store Beetle was discovered among specimens stored in the basement of Wing B, and as a result the whole of the basement

was fumigated with methyl bromide, the work being carried out by the London Fumigation Company.

Europe, Orient and North Africa. The usual number of enquiries was received during the year, with a small but distinct rise in the proportion of queries relating to Continental plants, no doubt as a result of the increasing popularity of foreign travel. The difficulty of identifying these Continental plants is increased by two factors, namely the tendency on the part of correspondents to replace dried specimens with colour-photographs, and the fact that the subjects of the enquiries are usually gaudy, tropical or sub-tropical species, cultivated in public parks and gardens, and not natives of the regions where they are seen.

Considerable progress has been made with mounting and laying-in European material which had been in storage, and plants gathered by Dr. P. H. Davis (Mediterranean area and Turkey), Mr. J. McNeill (Turkey) and Mr. Francis Merton (Cyprus) have been added to the Oriental Collections.

The thanks of the department are due to Mr. N. Y. Sandwith, not only for the gift of about 270 specimens, mostly from the province of Teruel, eastern Spain, but also for his kindness in examining and identifying these plants. Thanks are also due to Mr. J. E. Lousley, Dr. D. P. Young, Dr. S. M. Walters, Mr. D. H. Kent, Dr. R. Melville, Mr. V. S. Summerhayes, and to many others (both visitors and members of the staff) who presented specimens or literature, or helped with the identification of critical species.

In the course of the year a large number of specimens has been received from the National Herbarium of 'Iraq, collected by Mr. E. R. Guest, Prof. K. H. Rechinger, Dr. al-Rawi and others. Further collections have been received from Prof. R. Wheeler Haines and Hunting Technical Services.

The National Dianthus Collection has been increased by gifts of seeds from Prof. T. Reichstein (Tessin and French Alps), Mr. J. McNeill (Turkey), Dr. E. Paunero (Spain) and Miss A. V. Webster (Spain). In addition to these, 32 packets of seed received in exchange from Botanic Gardens were sown during the year. The selfing and crossing programme was impeded by poor flowering due to spring drought and insect attacks. Miss S. S. Hooper, officer in charge of the Collection, has almost completed an account of the South African members of the genus, and is working on a revision of the Spanish *Dianthus* species.

Northern Asia, China, Japan, and N. India. Curatorial and routine work has occupied much time during the past twelve months, a considerable amount being used on enquiries from other botanical institutions, and on the identification of cultivated plants. A collection of about 470 specimens, made by Theophilus Sampson in South China during the years 1884–7, was presented by the John Innes Horticultural Institution, and has been mounted and incorporated in the Herbarium, as have also a number of smaller collections received from other herbaria in exchange, the largest being a consignment of 200 specimens from the National Science Museum, Tokyo.

The manuscript of the revision of *Camellia* has been overhauled and is now in the printers' hands. The second, and concluding, part of the account of the Roxburgh Flora Indica Drawings at Kew, was published early in the year.

Tropical Asia. Mr. L. L. Forman has completed preliminary naming of part of the material he collected during his visits to E. Java, N.E. Celebes and

E. Borneo. The revision of Malaysian *Menispermaceae* has been resumed and a second part has been published.

The total number of specimens received by this department during the year was over 5,000. The main consignments were received from the Herbarium Bogoriense ; Rijksherbarium, Leiden; Botanic Gardens, Singapore; University of Michigan; Department of Forests, Lae; Philippine National Herbarium, Manila. Among smaller collections received from individuals, special thanks are due to Rev. N. E. G. Cruttwell for his collections from New Guinea.

Over 7,000 specimens have been mounted during the year and incorporated into the herbarium. Since more specimens have been mounted than the number received during the year, some impression has been made on the large accumulation of unmounted Malaysian specimens, which are arranged by families. All families up to *Burseraceae* have now been mounted and added to the herbarium.

Australasia. Among the collections received during the year were about 650 fine specimens presented by the Commonwealth Scientific and Industrial Research Organisation, Canberra, from North Queensland and Northern Australia, and a set from the Gammon Ranges in South Australia collected by Dr. H. Eichler of the newly established State Herbarium of South Australia. About 970 specimens were received in continuation of exchange from the herbaria of Sydney, Brisbane and Melbourne. 1,639 specimens were sent to Australian herbaria in continuation of exchange. A set of 1921, collected mainly in New Caledonia, was purchased from Dr. H. S. McKee; these included many isotypes of New Caledonian plants recently described by Prof. A. Guillaumin.

A number of enquiries concerned with critical plants and their nomenclature has been received from botanists revising state floras in Australia and New Zealand. Such queries often require appreciable research for their elucidation. Work on the Melville and Morrison collections has continued.

Tropical Africa. The effort of the additional Assistants employed in the Section this year has resulted in the routine work being kept up to date. Over 20,000 specimens have been received during the year and a similar number has been laid out for mounting. Over 21,000 Tropical African specimens have been incorporated in the Herbarium whilst nearly 13,000 determinations have been sent to collectors. Duplicate specimens presented to other herbaria in exchange number well over 7,000.

Some of the more important collections received were made by Prof. P. Jaeger (French West Africa); Mrs. G. W. Harley (Liberia); Mr. C. D. Adams (Ghana); Mr. D. P. Stanfield, Mr. R. W. J. Keay and members of the staff of the Forest Department (Nigeria); Mr. I. M. Evans and members of the Cambridge University Expedition, Dr. H. F. Mooney (Ethiopia); Mr. P. R. O. Bally (mainly Somaliland); Mrs. V. R. D. Dyson-Hudson, Mr. K. W. Harker, Dr. I. Langdale-Brown (Uganda); Mr. A. V. Bogdan, Dr. P. J. Greenway, Mrs. D. R. Tweedie, Dr. B. Verdcourt (Kenya); Mrs. H. G. Faulkner, Mr. R. E. S. Tanner, Mrs. H. M. Richards (Tanganyika); Mr. G. Jackson (Nyasaland); M. J. W. Clayphan, Mr. D. B. Fanshawe, Mr. W. D. Holmes, Mr. A. E. King, Mrs. H. M. Richards, Mr. E. A. Robinson, Mrs. J. M. Wright (Northern Rhodesia); and Sr. A. de F. Gomes e Sousa (Portuguese East Africa). Many interesting and useful specimens have been

received from the Government Herbarium, Salisbury, through Mr. R. B. Drummond, whilst by far the largest contributor to the East African collections has been Dr. P. J. Greenway of the East African Herbarium from which Institution we have received many hundreds of valuable specimens. A fine set of named specimens of the high-altitude plants collected by Dr. O. Hedberg in East Africa in 1948 was presented by Uppsala University. The large collections made by Mrs. Richards in S.W. Tanganyika and N.E. Northern Rhodesia and most generously presented to Kew are of especial value as Mrs. Richards visited many out of the way localities at the height of the wet season.

Duplicate specimens in continuation of exchange have been received from Prof. Dr. W. Robyns, Jardin Botanique de l'État, Brussels, Dr. G. Troupin, I.R.S.A.C., Lwiro-Bukava, Belgian Congo, Dr. R. E. Woodson, Missouri Botanic Garden and from the Imperial Forestry Institute, Oxford. Over 800 specimens collected by Herr H. J. Schlieben in Tanganyika during the 1930's, including a number of isotypes, have been purchased from the collector.

South Africa. Before returning to Pretoria, Mr. Killick's revisional work on *Eriospermum*, *Moraea*, and *Myrica* had reached an advanced stage.

Mr. Marais, who succeeded Mr. Killick at Kew as South African Liaison Officer, has been mainly occupied in dealing with problems received from Pretoria in connection with the projected "Flora of Southern Africa". A very large number of specimens was received on loan for this purpose and good progress in dealing with them has been made.

The specimens received for identification and named duplicates for incorporation have been fewer than usual, but there has been the normal number of requests for loans of material from both Pretoria and Cape Town.

America. The identification of the very large collections made by the late G. B. Hinton in Mexico between 1932 and 1943 was completed, and at the same time the Mexican specimens collected by Mr. E. K. Balls and Dr. W. B. Gourlay were studied. Two useful collections from the Lesser Antilles were dealt with, *viz.* those of Mrs. Pamela Beard (presented by her husband, Dr. John Beard) and Mr. I. Vélez (presented by the I.C.T.A.), and small consignments of specimens sent by the Imperial College of Tropical Agriculture, Trinidad, were duly examined. An interesting collection made in the interior of British Guiana by Mr. D. J. Atkinson was named for the Herbarium of the British Museum (Natural History) and duplicates have been presented to Kew. Among the more important collections received were fine sets of duplicates from the New York Expeditions to Southern Venezuela and Guiana, the historic Ekman collections in Hispaniola and Dr. E. Asplund's expeditions to the Andes (presented by the Stockholm Herbarium), and Dr. A. C. Smith's gatherings in the West Indies.

Work on *Bignoniaceae* was concerned with the examination of loans of historic type material from the Herbaria of Paris, Munich, Copenhagen, Stockholm, Uppsala, Lund, Göttingen and New York; while extensive series of specimens were forwarded for study by some of these institutions, as well as by the United States National Herbarium and the Chicago Natural History Museum, and by Prof. H. García-Barriga (Bogotá), Dr. R. Reitz (Brazil) and Dr. D. Lima (Brazil).

The task of protecting type specimens in special folders was at last completed for the tropical collections.

Orchidaceae. As in previous years many living plants were determined, both from the Gardens and from outside growers. Among the latter were many interesting British Guiana orchids from Mr. L. M. Mason. Routine determinations were also made of dried specimens received from many parts of the world, particularly from Africa. Queries with respect to individual species, groups of species or genera were also received from other institutions in various countries.

Research was continued on African orchids, particularly the genera *Platycoryne*, *Angraecum* and *Eulophia*. A short revision of the first named of these genera is at present in the press. Some research has also been carried out on Asiatic orchids so far as time has permitted.

Cyperaceae. Extensive collections of Tropical African *Cyperaceae*, of varied size and value, have been determined and added to the Herbarium. Many of these have come from Mr. E. A. Robinson, living and collecting in N. Rhodesia, and Dr. H. Wild, Government Herbarium, Salisbury, S. Rhodesia, has sent us a large duplicate collection, made by various persons, mainly in S. Rhodesia.

Numerous specimens of British sedges have been named for individual persons, societies and other institutions. This increase of routine naming has reduced the time available for work on the "Flora of Tropical East Africa." Records from the magnificent collection of sedges recently made in south Tanganyika by Messrs. Milne-Redhead and Taylor were added to some of the accounts of genera already prepared for the Flora, such as *Scleria*, *Eleocharis* and *Rhynchospora*.

Gramineae. On account of its economic importance, the number of specimens of this family received for identification or report shows no signs of diminishing, but tends to increase as more and more research is undertaken overseas. Most general collections have included a considerable number of grasses, and these and many other consignments entirely of these plants, have provided additions to the Herbarium. The chief countries or regions from which specimens have been received are:—British Isles, Cyprus, Turkey, Iraq, Pakistan, India, Malay Peninsula, Indonesia, New Guinea, Australia, New Zealand, many parts of tropical Africa, South and South West Africa, Canada, United States, West Indies and Venezuela.

A wide range of enquiries has been dealt with, such as those relating to nomenclatural and taxonomic problems, to type-specimens, references to literature, lawn grasses, sources of seeds or plants for experimental studies, flowering of bamboos, identification of seeds and leaf-fragments from birds' crops, and of vegetative specimens from lawns and grasslands.

Dr. N. L. Bor has continued his studies of Asiatic grasses and has almost completed his account of the species occurring in India, Pakistan and Burma. Mr. C. E. Hubbard's investigations have been concerned mainly with the preparation of the accounts of the family for African floras, and with studies on the genera of grasses.

Vascular Cryptogams. Apart from routine naming and reports much time has been spent on work for the "Flora of Tropical East Africa". In this connection, extra material from the personal herbarium of Dr. H. D. van Someren of Kenya has been received on loan. Five hundred sheets of East

African ferns on loan from the East African Herbarium have been named and returned to Nairobi.

The projected supplement to Christensen's Index Filicum has progressed during the year and well over three thousand names are now entered on cards.

Herbarium material received included a number of collections but none was of any great size.

Bryophyta. Important collections have included a valuable series of African mosses collected by the late G. H. S. Wood (named by R. Potier de la Varde), two sets of African liverworts from Dr. E. W. Jones, numerous mosses and liverworts from Indonesia, a set of Kurdistan Bryophyta collected by Mr. J. McNeill, and unnamed specimens resulting from the Cambridge University Expedition to Ethiopia. Specimens in continuation of exchange have been received from the Smithsonian Institution and Vienna. Of special interest were subfossil specimens of *Eurhynchium* and *Brachythecium* from the remains of a Roman fort at York and of a moss supposedly 1,000 years old from the Friesian Islands.

A start has been made in accumulating duplicate material from the British Isles for exchange with foreign institutions, and work has been continued on the naming of specimens from Gough Island and Tristan da Cunha, and on the genus *Sphagnum.*

Algae. There has been the usual number of enquiries concerning typification and type specimens, most of them relating to the valuable collections in the Turner and Hudson herbaria. Besides such routine enquiries, a diversity of subjects has been dealt with, for example:—identification of algae in aquaria in connection with Terrapin diseases, identification of algae from commercial sources, and such perennial problems as the treatment of algae-infested lawns.

Acquisitions include:—32 specimens from the East African Herbarium, Nairobi, collected by Miss D. Napper on the Kenya coast; 30 specimens (decas 46–48) in the series "Kryptogamae Exsiccatae editae a Museo Palatino Vindobonensi"; a well prepared set of 130 marine algae from Tanga, Tanganyika Territory, collected by Mrs. H. G. Faulkner. An item of special interest was the arrival from Malta of fourteen 5-gallon drums containing seaweeds in formalin-sea water. The collection consisted mainly of species of *Cystoseira*; these have been identified and forwarded to the Colonial Products Laboratory for analysis. As there was ample material it was possible to prepare pressed specimens for the Herbarium and also to add to those being set aside for exchange. In view of the taxonomic difficulties encountered in dealing with the Mediterranean representatives of *Cystoseira*, this material is most welcome.

A large part of the genus *Fucus* has been sent on loan to the Marine Station, Millport. Smaller loans have gone to Manchester University, the Marine Station, Gothenburg, and the Rijksherbarium, Leiden.

Fungi and Lichens. Notable acquisitions during the year included a large collection of British lichens presented by Dr. W. Watson of Taunton, and approximately half the myxomycete herbarium of the late Mr. Howard of Norwich. Mr. D. A. Reid made a large collection of Highland fungi, mainly from the Cairngorm Nature Reserve, including several species previously unrepresented at Kew. Numerous Australasian fungi have been received

from Dr. C. G. Hansford, and Dr. R. Singer has presented a large collection of Bolivian *Aphyllophorales* for naming. Dr. C. W. Dodge has revised our African material of *Usnea* in connection with his monograph (Ann. Missouri Bot. Gard. 43: 381–396 and 44: 1–76). Dr. Maas Geesteranus has revised the European collections of stipitate *Hydnaceae*.

Work on the *Xylariaceae* has been extended to include the African species of *Xylaria* and *Kretzschmaria*. Considerable time has also been devoted to a revision of the *Discomycetes* of the Waite Herbarium, Adelaide. Reports have been prepared on the *Ascomycetes* collected by Dr. R. Singer in Bolivia and on a long series of records of Oxfordshire fungi deposited at Kew by the late Dr. H. H. Phillips of Bicester (see Kew Bulletin, 1957: 97–106).

Mr. D. A. Reid has determined extensive collections of *Aphyllophorales* received from Prof. O. Fidalgo (Brazil), Mr. A. French (Uganda), Dr. R. D. Hoogland (New Guinea), Mr. A. Johnston (Malaya), Prof. B. d'Oliveira (Sao Thomé), Mr. C. T. Pyne (Sierra Leone) and Mr. N. E. M. Walters (Australia) and has prepared a report on the *Thelephoraceae* of the Mussoorie Hills, India, now in the press.

Spirit Collection. Just over 1,000 gatherings were added during the year, the collection now containing over 14,000 bottles of material. As in previous years the greatest number of these were of the family *Orchidaceae*, but over 150 collections of *Lentibulariaceae* were added and this family, particularly the genus *Utricularia*, is now quite well represented. Work was started on spacing out the bottles of families other than the *Orchidaceae* as some of the cupboards have become very congested. The great value of the collection, as regards those families which are reasonably well represented, becomes more evident with each piece of research undertaken.

Nomenclature. There has been the usual flow of nomenclatural enquiries. Correspondents still fail to realize the very real difference between nomenclature and taxonomy; it is not possible to say whether or not a name is correct unless it is related to a specimen, and the queries received often do not make it clear whether it is the name itself or the identification of a plant which is in question.

Further contributions to *Index Nominum Genericorum* have been submitted for publication and an index of family names has been prepared for publication.*

Index Kewensis. The compilation of Supplement XII (1951–55) has been completed. The cards have been prepared for press: the first half was sent to the Clarendon Press in October, the remainder in December. Supplement XII will contain 20,479 entries (Supplement XI, covering ten years, contained 35,000 entries). A copy of the second half of the manuscript (*Malesherbia–Zygostates*) has been made and is now available for consultation.

It has been possible to make a start with the compilation of Supplement XIII (1956–60), as additional help was given during October and November.

The Library

Work on the new card catalogues has continued steadily throughout the year and slow though steady progress has been made with these essential tools for both librarian and scientific staff. The classified catalogue continues to grow, but plans to move it into the central library have not yet been imple-

*"Taxon", 7 (1) : 1–35 (1958).

mented, owing to lack of space. Cards for the new author catalogue, however, are in course of amalgamation with those of the old card catalogue in the central library, and all entries are being arranged in strict chronological order.

The total stock of the library now amounts to well over 55,000 volumes. Over 40 volumes have been purchased through H.M.S.O., from Mrs. H. N. Ridley, and by the Bentham-Moxon Trustees, while we are indebted to the Director, the Assistant Director, Dr. W. B. Turrill, and many others for donations amounting to over 150 books and papers. Many volumes have also been received from the publishers for review in the Kew Bulletin, and a large number of periodicals has been received in exchange for this Journal.

During the year, the library has continued to increase alarmingly in size, and the problem of overcrowding, particularly on the periodical shelves, has become even more acute. No additional storage space being available, it is felt that the only solution lies in the provision of a new and larger library as soon as possible when the proposed new wing of the Herbarium is built.

Work on stamping and making ready the large and very useful collection of reprints presented last year by Dr. W. B. Turrill has continued throughout the year.

We are indebted to the Ministry's Photographic Department for their continued co-operation when photo-copying work has been required, usually of manuscripts and rare works. Their promptness and care in this work have been much appreciated.

Our gratitude is also expressed to those societies, institutions, and academies who have so kindly sent us valuable contributions of literature.

Loans have been made, as in previous years, to the libraries of other Government Departments, Agricultural Bureaux and similar institutions. Many of these same libraries have lent us publications for use by members of the staff.

Our collection of maps has been further enriched by gifts from the War Office, the Ordnance Survey and others; the collection of drawings has similarly benefited by the generosity of various donors.

Department of Economic Botany

Museums of Economic Botany

Enquiries regarding economic plants and plant products followed much the same lines as in previous years. About eleven hundred enquiries were dealt with by correspondence while personal visits, usually from visitors from abroad, and telephone calls accounted for many more. Information was supplied to visitors on such diverse subjects as—extermination of camel thorn (*Alhagi camelorum* Fisch.) from air fields in the near East: the possibility of growing species of *Opuntia* for "cactus candy": methods formerly used in wooden toy manufacture: vegetable waxes: the cultivation of kola and other tree crops: sources of reeds for clarionets: identification of archaeological remains from Gibraltar: plants alleged to cure snake bite: the history of spices in the Mediterranean region: significance of *Ryania* as an insecticide: rushes for rush work: the classification of groundnut varieties.

Among the enquiries dealt with by correspondence were several relating to Rauwolfia and the possibility of cultivation in different parts of the world. Some of the other enquiries were concerned with—the production of

cascara bark: commercial lavender growing: impurities in papain (stigma remains of *Carica papaya*): South African "maroola nuts" (*Sclerocarya caffra* Sond.): advice on obtaining supplies of dried leaf of *Lochnera rosea* Reichb.: cultivation of vanilla: properties of *Stevia rebaudiana* Hemsl. and *Catha edulis* Forsk.: germination of oil palm seeds: cultivation of *Lobelia inflata* L. for medicinal purposes: the uses of tree lucerne (*Cytisus proliferus* L.): Brazilian guarana (*Paullinia cupana* H.B. & K.): species of *Sterculia* and *Cochlospermum* as gum producers: *Salvia superba* Hort. ex Vilm. and its nectar value for the hive bee: *Malpighia punicifolia* L. as a source of vitamin C.

A budgerigar seed mixture (millet and canary seed), suspected of poisoning budgerigars, was found to contain several seed impurities, among them darnel (*Lolium temulentum* L.). The toxicity of darnel to man and domesticated mammals has long been recognised but it would seem that adequate evidence of toxicity to budgerigars or other cage birds has yet to be established or proved.

Seeds received for identification included an unusual seed found in the drift on the seashore on the south coast, near Eastbourne. This proved to be the seed of *Pangium edule* Reinw., known to be a drift seed of the Malayan region. It may be argued that it is theoretically possible, from known ocean currents, for a Malayan drift seed to reach British shores via the Cape. However it would seem more likely that this particular seed may have been discarded from a vessel from the East when passing through the English channel.

Burrs which had proved troublesome in the wool of sheep in Kent proved to be the fruits of *Medicago arabica* Huds.,which are also known to occur quite freely in some imported wool. It is believed that the use of wool shoddy as manure on farms may sometimes account for the spread or localised occurrence of this plant.

Among the miscellaneous specimens received were a large number showing abnormalities or teratological phenomena, the number being possibly greater than in most years. This may have been due to the belief, apparently held by some people, that any form of abnormal growth they may observe in plants must be due to increased radio-activity or atomic fall out!

The skeletonizing of leaves and methods of accomplishing this has again been the reason for a number of enquiries. This practice was popular in Victorian times and it would seem that there is now a revival of interest in it. The present popularity of dried foliage and fruits for indoor decoration may be in part responsible. Skeletonized leaves are again in use with some florists.

Donations received during the year included a good collection of fruits of Nigerian oil palm varieties preserved in fluid, through the generosity of the Director of the West African Institute for Oil Palm Research in Nigeria and Mr. A. O. Egbuniwe who studied at Kew as a horticultural student for some time. Another notable donation, from a British firm of agricultural seedsmen was a collection of seeds and seed-heads of up-to-date varieties of pasture grasses and cereals now grown in the United Kingdom.

A number of additions were made to the reference collection of woods (geographical sets) during the year, particularly from African sources. The collection was rearranged and recatalogued.

Members of the staff served on committees in London that are concerned

in some way with economic plants or plant products. Mr. S. G. Harrison accompanied Dr. R. Florin, Director of the Hortus Bergianus in Stockholm and a well known authority on Gymnosperms, on visits to several of the more important collections of Conifers in the south of England during the month of August and was able to procure some useful herbarium material of some of the less known Conifers.

Distribution of Economic Plants

The flow of plants through the Quarantine House was rather less than in the previous two years, chiefly because most of the demands for planting-material of cacao had by now been met. During the year some rooted cuttings of the Samoa cacao clone 'Lafi No. 7' were sent to W. Nigeria, and cuttings of two Grenada selections were rooted for despatch to Fiji in 1958.

Shipments of banana plants were heavier. Commercial varieties distributed included 'Gros Michel' and plantains to Western Australia, and 'Lacatan' and 'Robusta' to the British Cameroons. One of the Malayan diploid varieties collected for the banana-breeding programme at the Imperial College of Tropical Agriculture was sent by air in the autumn after two years in quarantine. Plants received into quarantine for later forwarding to Trinidad included banana clones from New Guinea, Zanzibar, Tanganyika, Kenya, and Uganda, and space was also found for plants of 'Giant Cavendish' proceeding from Trinidad to the British Cameroons. Unfortunately the growth of bananas during the cooler months has not been as vigorous as might be wished, and evidently the heating of the new house is less than adequate for good results.

Other plant-material distributed included plants of *Rauwolfia serpentina* Benth. ex Kurz. and of the star anise, *Illicium verum* Hook. f. sent to E. Nigeria, and good strains of grasses *Digitaria decumbens* Stent, *Dichanthium caricosum* A. Camus and *Ischaemum timorense* Kunth for the enrichment of pastures in Viet Nam. Seven varieties of cotton, raised in Greece and intended for Cyprus, were grown in the quarantine house and made excellent growth without evidence of disease.

In dealing with many enquiries relating to tropical plants of economic use, special attention was given to the species of *Dioscorea* which are of possible interest as sources of diosgenin, a precursor of cortisone, and to the flowering and fruiting behaviour of the carob, *Ceratonia siliqua* L. An attempt was made to separate the species of *Raphia* which, though put to so many useful purposes in West Africa, have not been clearly distinguished. This study could not be completed through the inadequacy of representative material in the Herbarium.

Mr. T. A. Russell continued to serve on the International Commission for the Nomenclature of Cultivated Plants which met in London from 4th to 6th December to draw up a revised code for the giving of cultivar names in horticulture, agriculture, and forestry.

Jodrell Laboratory

Research

It is disappointing to have to report that it is taking longer than was anticipated in the annual report for 1956 to complete the forthcoming reference book on the anatomy of the Gramineae. Very considerable

progress has, however, been made with the necessary bibliographical work, and it is expected that the task of typing the final draft of the whole book will shortly be started.

Minor anatomical investigations undertaken during the year include the following. (i) The structure of the wood of Saman trees, *Samanea saman* (Jacq.) Merrill, from Trinidad and Jamaica respectively has been compared at the request of the authorities at the Imperial College of Tropical Agriculture in Trinidad. The interest of this investigation lies in the fact that the wood of the Jamaican trees has quite different working qualities from that of the trees from Trinidad, although the trees from both islands have hitherto been regarded as belonging to the same species. Differences in the structure of the wood from the two islands have been noted, and the matter is still under investigation. (ii) The structure of the leaves and stems of certain plants has been examined on behalf of colleagues at the Herbarium with a view to elucidating the taxonomic affinities of the plants concerned.

Turning to physiological investigations, Dr. M. Y. Stant has studied the influence of gibberellic acid on the growth of certain economic plants, special attention being devoted to some of those that are used as sources of vegetable fibres. Starting in the early summer the plants were sprayed once a week with gibberellic acid in aqueous solution. Plants treated in this way grew appreciably taller than the controls, the internodes becoming longer and the leaves narrower. The results so far obtained are of academic interest rather than of practical importance, but they are felt to be sufficiently promising to justify undertaking further experimental work with gibberellic acid in 1958.

Dr. Stant has also been concerned with the detailed supervision ot experiments undertaken in collaboration with the Tropical Department to test the effect on their growth of irradiating certain tropical plants (particularly seedlings and young plants)with light from mercury vapour lamps. Starting at the beginning of October, the experimental plants have been irradiated from 8 a.m. until 8 p.m. every day, the artificial light being used to supplement the normal daylight. Whilst it is at present too soon to report detailed results, it is, nevertheless, already clearly evident that many of the irradiated plants are growing much more vigourously, and look more healthy, than the controls.

Routine Work

The routine work has remained at about the same level as in recent years, and reports have been sent in response to about 130 enquiries. Much of the work has consisted in establishing the botanical identity of miscellaneous vegetable material from its microscopical structure, and many of the specimens examined have been timbers, items of archaeological interest, and roots clogging up field drains, sewers and pipes, or undermining the foundation of buildings.

Some of the more interesting items include the following. Material received as "Hop Seeds" from Hong Kong was found to consist of the flower buds of *Sophora japonica*. A piece of bark and the stem of a woody climber, both found in the car of a murdered man, were examined on behalf of the Michigan State Police, and identified as having been derived from *Schinus molle* and *Machaerium* sp. respectively. The stock of a crossbow, which is believed to have belonged to a member of the Royal Family in about A.D.

1550, was received from the Tower of London and identified as Hawthorn or Pear. Dried berries from Iran, with reputed medicinal properties, proved to be those of *Loranthus* sp. Etiolated shoots bearing minute scale leaves, found beneath the floor of the living room of a private house at Kew, proved to be those of *Mahonia aquifolium*. Frozen spinach of Dutch origin, which was suspected by the importers of being a substitute for the genuine article, proved to be correctly named. Rice bran of American origin, which was alleged to contain Castor Seed, was found to be free from this impurity. Stone cells, which were stated to be responsible for the poor quality of Esparto paper in which they are sometimes to be found, proved to be derived from the extreme base of the culm of the Esparto plant (*Stipa tenacissima*). The stone cells could have been eliminated by more careful harvesting of the crop. Another unusual enquiry was concerned with the identification of leaves in large deposits that were clogging up the filters of a recently erected power station.

Additions to the Slide Collection and Material presented for Research Purposes

It is a pleasure to record the receipt of preserved material of Monocotyledons for research purposes from the following sources. Mr. J. W. Green (Australia, chiefly Haemodoraceae and Cyperaceae); Dr. H. Hamshaw-Thomas, F.R.S. (S. Africa, miscellaneous genera); Dr. P. B. Tomlinson (Malaya and Ghana, miscellaneous genera). Gifts of microscope slides include slides of Musaceae from Dr. Tomlinson, and of conifers from Professor R. Florin. Additional slides prepared for the collection of Mr. F. Richardson and Miss D. M. Catling include 370 of Monocotyledons and 41 of timbers of miscellaneous species.

Visitors

Professor R. Florin, Director of the Bergianska Trädgården at Stockholm, used the laboratory as his headquarters in August whilst visiting England to collect and fix specimens of rare conifers.

Mr. Mahommed Osman Abdul Azziz, a technician from the Botany Department at University College, Khartoum, improved his knowledge of microtechnique by working for several months under the supervision of Mr. F. Richardson.

Other visitors who worked for short periods were Dr. Tomlinson (Anatomy of Monocotyledons), Mr. Lorch (Israel), and Mr. Bogdan (Kenya) who studied the structure of a few grasses.

The Gardens

The early months of the year were characterized by periods of mild weather, followed by cold spells and late frosts which were responsible for some damage to Rhododendrons and other plants. Rainfall was less than usual in the first half of the year but much rain fell in the second half. This helped in the recovery of plants generally and brought about a considerable secondary flowering of many trees and shrubs.

During the year the Gardens were visited by over one million visitors, which can be considered satisfactory in view of the abnormal wet months of July, August and September, when attendances as a whole are generally higher in a normal year.

Arboretum South

There were exceptionally severe frosts on the 10th and 18th February which put an end to the flowering of the early Rhododendrons. A subsequent drought did much to hamper the flowering of the late Rhododendrons and the display in the Dell was very uneven.

In early March about 200,000 snowdrops were planted out in the woods on each side of the path thgough Queen's Cottage. A number of winter aconites and primroses were also planted among them.

Plans are in hand for the rearrangement and expansion of the collection of Rose species. New beds are being formed to the west of Holly Walk and a new site has been selected for the *Philadephus* collection.

About 300 species and varieties of trees and shrubs not previously in cultivation were added during the year.

The rabbit menace still remains and is increasing.

Temperate Department

From one point of view, the year has seen great progress in the Department. The gallery on the Temperate House, after being shut to the public since 1938 owing to its unsafe condition, was reopened in spring, the rusty chequer plates having been replaced by oiled hardwood. The main centre paths and the perimeter path in the centre block of the Temperate House were surfaced with cold asphalt at the same time. This produced a surface more pleasant to walk on, easier to maintain and resistant to pitting by drip from the roof. The rusty plant stage in the southeast quarter of this block was replaced by concrete staging after the collapse of several sections. The floor of the South Octagon was surfaced with concrete in autumn and winter to prevent the leakage of drainage water into the boiler house below. In October, repainting of the whole interior of the Temperate House was begun, and will continue until well into 1958. This work has necessitated extensive scaffolding, which in turn has made it necessary to prune, lower or tie up the numerous climbing plants on pillars and the roof. At the Pits, automatic oil-fired boilers were installed in late summer. Most of the initial troubles in this system have now been corrected.

With so much work in progress, and with the garden staff frequently outnumbered by building and allied trades the year has been a difficult one, aggravated by periods of understaffing. The only mitigating feature was the convenience of easy access to the high roof from the scaffold. Full use was made of this for high pruning, the removal of surplus wires, and the renewal of others needed for the support of plants.

Three plants from the Department were figured for the Botanical Magazine in 1957, viz. *Richea dracophylla*, *Rhododendron lindleyi* and *Orthrosanthus* sp. *Datura* "Knightii" and *Clematis napaulensis* received Awards of Merit and *Richea dracophylla* was given the Botanical Certificate. *Boronia heterophylla* and *Dietes grandiflora* were also exhibited at R.H.S. Shows. Flowers of several cultivars of *Camellia japonica* were supplied at the request of the R.H.S. Camellia Nomenclature Sub-committee.

The collection of *Callitris*, previously in a confused state was examined by Dr. R. Melville. Many corrections were found necessary and the collection was relabelled and indexed. Labelling generally received less attention than last year owing to pressure of other work, but just over 300 display labels

were produced in the Department apart from small pot labels, and the first batch of about 50 engraved labels was received from the machnist in December. For the same reason, seed collecting could not be carried out as regularly and systematically as desired, but last year's total of items collected was just exceeded, thereby continuing the upward trend of the last six years. The number of packets distributed, 1,222, was the highest ever from the Department, so far as records show. These figures relate only to seeds distributed in the "Plants under Glass" section of the Seed List, no separate figures being available for seed from plants on outside borders or for fern spores from the Temperate House.

A large number of seeds of Hawaian endemics were received from Dr. J. F. Rock and are being raised. Almost all of these are of species never before in cultivation in this country.

Alpine and Herbaceous Department

Work in the rock garden was started again in autumn on the site facing the orchid houses. One hundred and fifty tons of Sussex sandstone and 400 cu. yds. of soil will have been used on this area when the work is completed. The plants in the section reconstructed the previous season made particularly good growth and by the autumn had become well established. The northeast corner of the rock garden adjoining the old rose walk, which had been stripped in an effort to eradicate the Equisetum was treated twice during the spring and summer with an application of sodium chlorate. It is hoped that by leaving this ground vacant for one more season and giving further treatment, the *Equisetum* will be eradicated.

There was a fine display of Primulas and Meconopsis, etc., many planted only the previous year, on the newly constructed border at Cumberland Gate. Other plants of outstanding merit were:—*Lilium humboldtii*, which produced some exceptionally strong flowering spikes *Cassandra calyculata*, an interesting member of Ericaceae, *Cyananthus sherriffii* and *Phyteuma spicatum*, the latter produced some very fine flowering stems—this plant is now very uncommon even in its native habitat; *Phlox glaberrima*, raised from seed collected originally by Professor Curtis along the Atlantic coast of North America; *Stellaria chamaejasme*, a very rare plant, native of the high mountain ranges of Tibet; *Dracocephalum speciosum*, a large flowered species, made a very notable display, one of many good plants raised from seed collected by Messrs. Stainton Sykes and Williams on their Nepal expedition in 1954. From the same collecting *Codonopsis convolvulacea* proved very attractive with its large light blue flowers and twining stems growing up through small leaved Rhododendron bushes.

On the mound site adjoining the *Hosta* and *Hemerocallis* species collection near Cumberland Gate, several large new beds have been constructed among the young birch trees. It is proposed to grow Lilies, Primulas, *Meconopsis* and other plants which require a woodland setting.

The following are a few of the plants which were interesting or outstanding when in flower:—*Coreopsis atkinsoniana* and *Polemonium californicum*, two very attractive perennials from North America, seed of which was sent to us by Carl English; the white flowered form of *Epilobium angustifolium*, plants of which were received from Miss Gray who had collected them from an isolated locality on the hillside near Ballater, Scotland, and *Delphinium*

vestitum, a very distinct and strong growing species which had been raised from seed collected by Polunin, Sykes and Williams on their expedition to Nepal in 1952.

Owing to the very mild winter, many pans of Snowdrops, Crocus, Cyclamen and Narcissus flowered much earlier than usual, enabling the Alpine House to be opened on the 2nd February. Throughout the spring and early summer the show of flowering bulbs and other subjects suitable for pan cultivation attracted much attention. Among the many good plants on show, the following require special mention: *Iris atrofusca*, a native of Palestine and a difficult species to keep in cultivation; *Salvia caespitosa*, a charming little sub-shrubby plant best grown in the Alpine house; *Aristolochia sempervirens*, always interesting because of its unusual shaped flowers; it is a native of Crete and likes plenty of sunshine; *Silene laciniata*, another sun-lover bearing large scarlet flowers and native of Mexico; *Convolvulus pitardii* var. *leucochnous*, a trailing plant with large rich pink flowers, raised from seed from N. Africa, but may not proved hardy; a fine specimen of *Phyteuma comosum*, a beautiful Alpine closely allied to the genus *Campanula* whose home is in rock crevices of the mountains of south Tyrol.

Many plants were exhibited at the R.H.S. shows and the following received an Award of Merit:—*Liatris spicata*, a very useful herbaceous plant native to the southern and eastern parts of the United States; *Cynara cardunculus*, a very tall handsome plant; *Campanula boussonetiana*, a very attractive little annual with violet coloured flowers suitable for growing in pans for the Alpine house and on the rock garden, and *Roscoea cautleoides* "*grandiflora*", a very large yellow free flowering form which originally occurred as a seedling in the rock garden at Kew.

Many large and interesting consignments of seeds and other plant material were received during the year, including the following : A miscellaneous collection of seeds from the Alpine Garden Society. Prof. T. Reichstein sent two most interesting lots of native seeds which he had collected, one from the south Tyrol and the Italian-French border, the other from the Pyrenees. Useful and interesting Narcissus were received from F. R. Waley, while Mr. L. W. Neel, Walton Park Nurseries, sent several new Iris spp., including *Oncocyclus* types which are difficult to establish in this country. A valuable collection of Lily bulbs were received from F. Skinner of Manitoba and J. C. Taylor of Ontario College, Guelph. A very interesting batch of alpine seeds were also received from Prof. W. Gajewski, who collected in the Tatra Mountains of Poland. Sir F. Stern sent in many interesting seeds, bulbs and plants including some of his noted *Eremurus* and lily hybrids. Seeds of Caoifornian Alliums and *Calochortus* were sent by Prof. L. Mann. It is to be hoped that the species will take kindly to our conditions, as most are new and have not been in cultivation previously at Kew. Several consignments of native plants have been sent from Japan. Most arrived in good condition by air mail packed in polythene bags.

The amount of seed collecting and cleaning was well above that of the previous seasons, although many late flowering plants failed to set seed. A considerable number of new items were collected. New green plastic labels of two sizes are now to be seen in the rock garden and herbaceous beds. They replace the old green china types which are very easily broken.

Arboretum North

As in previous years, the spring display of flowering shrubs and trees, also bulbous subjects, were again above average, and as might be expected, the Magnolias, Rhododendrons, Prunus, Malus and Syringas taking pride of place for sheer mass of colour. There were, however, many other noteworthy examples, and mention may be made of a number of them.

Amongst the winter-flowering shrubs, *Hamamelis mollis*, the large specimen near the Ferneries commenced to flower before Christmas and continued until February. Nearby specimens of *H. japonica* var. *arborea* also produced a pleasing display. Of interest during January were several examples of *Lonicera standishii* and also the hybrid *L. purpusii*; *Chimonanthus fragrans* and its var. *luteus*, while the comparative new-comer *Viburnum bodnantense* again provided an attractive display and ample proof of its qualities as a first-class garden subject.

Some damage to the young growth of shrubs and trees resulted from spring frost, particularly on the 11th April, when 5°F. were recorded. Young growth was cut on Magnolias, Rhododendron, Davidia, Spiraea, Syringa and others, but it did not prove very serious. The summer apart from the month of June, was disappointing, and the wet season that followed, although ideal so far as Kew is concerned for the growth of trees and shrubs, again caused difficulties with grass cutting, and the keeping down of weeds.

It has been necessary to remove several of the larger trees during the year, the chief losses being the large specimen of *Quercus palustris*, along the cart-road, and also a nearby *Fraxinus americana*.

Serious damage was caused to the large White Lime *Tilia tomentosa* during the severe gale experienced on August 16th. This tree, growing near the Syon Vista had several of its large limbs broken and a large split occurred in the main trunk. Fortunately, after the removal of the lower branches, it was possible to repair the damaged portions of the trunk and fill the extensive basal cavity. It is hoped, with these repairs and a thinning out of the upper framework of branches, that this fine tree will continue for years. Other repairs to old trees have been necessary, and they include the filling of a large cavity in the main trunk of the specimen chestnut-leaved Oak, *Quercus castaneaefolia*—one of the largest and oldest trees in Kew. The large tree of *Zelkova carpinifolia* in front of the Herbarium has also received attention.

A serious bark injury to the specimen tree of "Turkish Hazel", *Corylus colurna*, was noticed during the spring. The affected area, involving more than two thirds of the trunk of the tree, has been treated with a new bituminous preparation containing copper sulphate. Although it is too early to say if the tree will continue to live and support the large framework of branches, there are hopeful signs of recovery, especially with callus formation and new bark. Other experiments with this new bituminous tree wound dressing have been undertaken, particularly on certain trees that are known to have sensitive bark that has proved slow to heal.

Tropical Department

Tropical Pits

During the year propagation of young plant material to furnish the beds, and side stages in the reconditioned Palm House, was continued. Large consignments of seeds, bulbs, and plants, from home and overseas were

received and many successfully established. A large number of Palm seeds germinated freely, and of the young plants now making rapid progress, several are new and valuable additions to our collection.

The overseas material came chiefly from Bermuda, Ghana, Dr. Rock, D. Barry, R. Birdsey, W. J. de Leon, U.S.A., and L. C. Leach, S. Rhodesia. The main "home" donors were Messrs. T. Rochford & Sons, Shirley Aquatics, E. B. Anderson, T. Barnard, and L. Maurice Mason.

Lighting experiments under the control of the scientific staff were commenced in the autumn in Pit No. 18 A, Melon Yard. A varied range of tropical and subtropical plants were selected for the experiments. The treated plants are subjected to twelve hours of artificial light per day. Many of the treated plants have responded to the additional light, the most outstanding being *Cnicus vulvaricus*, *Impatiens hawkeri*, *Justicea flava*, and *Jacobinia suberecta*, all of which have almost doubled their growth. Plants such as *Scilla violaceae* and *Laportea gigas* show very little difference in growth between the treated and controls. By the spring useful data from these lighting experiments will be available.

During the year one hundred and fifty nine consignments of plant materials were packed and despatched to various Botanic Gardens and Horticultural Institutes at home and overseas. The following plants were shown at the Royal Horticultural Society's shows in London and received an Award of Merit:—*Thunbergia grandiflora*, *Utricularia alpina*, and *Begonia coccinea*. Certificates of Cultural Commendation were also awarded to *Utricularia alpina* and *Dorstenia bornimiana*.

Quarantine House

In spring and the summer months the propagation of the various classes of Theobroma cacao was continued and 188 plants were successfully raised. Early in the year it was found necessary to dispose of several of the old redundant stock plants of Theobroma to make room for a large consignment of Cotton plants which had to be quarantined for seed raising purposes. In early spring seeds of seven varieties of Gossypium (Cotton) were sown. The seeds germinated freely and 500 plants were raised. By mid-summer many of the early varieties had reached maturity and commenced to flower and fruit profusely, and a very good crop of Cotton was produced. The crop was harvested and the seeds extracted ready for despatch to the Cyprus Agricultural Department. Sixty plants of Paullinia cupana were rooted from cuttings; these young plants are now well established ready for despatch in spring. In the early part of the year the Sultanian Vine from Cyprus was grafted on to Vitis aestivalis, a very robust stock. The grafts proved successful and plants grew rapidly during the summer. When dormant they will be sent to the Department of Agriculture, St. Helena.

The following plants were sent abroad:—

16 Musa suckers to the Department of Agriculture, Freemantle, W. Australia.

39 Musa suckers in variety to the Cameroons Development Corporation, Bota, British Cameroons. 15 plants Illicium verum and 4 plants Rauwolfia serpentina to the Department of Agriculture, Enugul, E. Nigeria.

4 Musa suckers to the Director, Imperial College of Tropical Agriculture, Trinidad.

Orchids

The orchid show houses provided a continuous and colourful display of flower, throughout spring and summer. Uncommon Orchids which flowered well during the year were *Cymbidiella rhodochila*, *Koellensteinia tricolor*, *Cheiradenia cuspidata*, *Brassavola perrinii*, *Cynorchis uncinata*, and *Coelogyne pustulata*. Twenty-one donations of Orchid material were received to enrich our vast collection of species. They came chiefly from New Guinea, Africa, Indonesia, Venezuela, Fiji, Jamaica, and W. Ethiopia.

Experiments were carried out with Polythene in the *Odontoglossum* house. The interior was lined throughout with polythene forming a cavity of approximately six inches between the glass and polythene. This experiment proved most successful for the cultivation of cool Orchids such as Masdevallias, Pleurothallis, Stelis, and Odontoglossums. It produced better growing conditions, increasing the humidity and keeping the temperature of the house cooler during the summer months. It also provided light shade for early morning and evening when the lath blinds were not in use. The cool Orchids responded remarkably to the improved conditions, producing an abundance of new growth and in many instances larger pseudobulbs were formed.

It is interesting to record the vast improvement in the exotic plant collections in the new No. 10 and 10A Teak houses constructed in 1956, due to the additional light and better heating facilities. The young climbers planted early in the year in well prepared beds under the side stages soon reached maturity and flowered freely. The most outstanding climbers were *Odontadenia grandiflora*, and *Thunbergia grandiflora*, the latter produced large racemes of deep blue flowers throughout the summer months. The Sarracenias and Droseras in house No. 10A have never been finer than this year. They flowered freely in the spring and then due to the additional light produced luxuriant growth.

South African House

The raised beds in this house were renovated and a large number of new South African plants introduced. The Conophytums and *Lithops* flowered well in August and September.

The Office of Works rebuilt the T. Range stokehold chimney stack. This new chimney was constructed with a cavity wall to prevent heat loss in the stack and thus make the boilers more efficient.

Palm House

The renovation work on the centre section of the Palm House went on without a break throughout the year, and was completed by the middle of December. The slate edging around the permanent beds was replaced by reinforced concrete and the three central beds on each side of the middle pathway was lengthened by two feet, to provide more planting space in the centre. The York stone path between the two central doors proved unsafe, and was replaced by reinforced concrete over which square prefabricated stones were laid. A new hut and pump room were built on the same site as the old hut. During the renovation work the engineers installed new hotwater pipes and valves under the iron gratings. The plants housed in the two reconditioned north and south ends continued to show a general improvement in spite of being crowded together for so long. Several of the large

Cycads produced cones, and the large specimen of *Brownea crawfordii* developed three or four large trusses of flowers in spite of the disturbance it had had. Many of the large specimen Palms and other plants are now planted in their permanent positions.

No. 15 *House*

The Tropical Water Lilies and other exotic flowering, climbing, and foliage plants gave a magnificent display throughout the season, and were greatly admired.

Ferneries

Throughout the year several valuable collections of Fern material and spores were received, these came chiefly from Assam, Nepal, Nyasaland, Japan, South Africa, Rhodesia and Tanganyika. Of the new introductions the following Fern spores were successfully raised:—*Aspidotus schimperi*, *Camptosorus sibiricus*, *Cheilanthes bergiana*, *Lonchitis stenochlamys*, *Peranema cyatheoides*, and *Polystichum stimulans*.

No. 1 *House*

The Ministry of Works commenced to reglaze the roof late in the summer, and up to December only two thirds of the South west side have been completed. They are using longer panes of glass to cut down the number of laps and to provide more light which will be very beneficial to the exotic Aroids. New timbers have been erected in the corners and along the back wall. These timbers have been covered with epiphytic plants, such as Bromeliads, Dischidias, and a few tropical Orchids. The following outstanding plants flowered during the season:—*Anthurium imperiale*, *Amorphophallus prainii*, *Eucharis grandiflora*, and *Zingiber spectabile*.

House No. 5

The rehousing of the large collection of Cacti and Succulent plants, in the new aluminium alloy house, commenced early in the new year. This work lasted for two months, during which time two small rockeries, one in the warm section, and one in the temperate half of the house were constructed and planted. Many of the very large specimen Agaves and Furcraeas, which had been stored in the Temperate House for over two years had to be shaken out and replanted into smaller tubs. The side stages were furnished with young plants, and the house was reopened to the public in early March. The plants responded quickly to the additional light and better growing conditions, and by the end of the season many of the plants such as Aloes, and Cacti, almost doubled their growth, and several Euphorbias, e.g. *E. grandicornis* flowered with profusion, and set seeds for the first time for many years. Other interesting plants which flowered were:—*Agave filifera*, *Agave goleottei*, *Furcraea calenza* var. *integra*, and *Bromelia fastuosa*. Several collections of living plants were donated, many proving valuable additions. The chief donors were:—P. R. O. Bally, Nairobi; H. Hall, Kirstenbosch Botanic Garden; E. Shurley, and Mrs. V. Higgins, Croydon.

Despite constance vigilance, no fewer than thirty specimens of Cacti and Succulents were stolen from the plants in this house.

Publications

Bor, N. L. Notes on Asiatic Grasses: XXVII. A new name in *Sporobolus*, in Kew Bull. 1957: 233–235 (1957).

Hubbard, C. E. Notes on African Grasses: XXV. *Nematopoa*, a new genus from Southern Rhodesia, in Kew Bull. 1957: 51–52 (1957); XXVI. *Piptophyllum*, a new genus from Angola, in Kew Bull. 1957: 52–53 (1957); XXVII. *Crinipes* Hochst., a genus of grasses from North East Tropical Africa, in Kew Bull. 1957: 54–58; XXVIII. New species from Tropical Africa, in Kew Bull. 1957: 58–64 (1957).

Ballard, F. New African Ferns, in Kew Bull. 1957: 47–49 (1957); An African *Odontosoria*, in Kew Bull. 1957: 143–144 (1957).

Blakelock, R. A. Notes on the Flora of 'Iraq—part III, in Kew Bull. 1957: 177–224 (1957); Notes on African *Celastraceae*: II, in Kew Bull. 1956: 555–557 (1957); III, in Kew Bull. 1957: 37–39 (1957).

Brenan, J. P. M. Notes on *Mimosoideae*: III, in Kew Bull. 1957: 75–96 (1957).

Brenan, J. P. M. & Exell, A. W. *Acacia pennata* (L.) Willd. and its relatives in Tropical Africa, in Bot. Soc. Brot. ser. 2, 31: 99–140 (1957).

Bullock, A. A. *Radyera* nom. nov. in Kew Bull. 1956: 454 (1957); Notes on African Asclepiadaceae: VIII, in Kew Bull. 1956: 503–522 (1957); The compulsory Latin diagnosis, in Taxon 6: 215 (1957); The typification of the generic name *Callitris*. ibid. 227; Nomenclatural Notes: I, in Kew Bull. 1957: 296 (1957); Nomenclatural Notes: II. ibid. 356 (1957); The application of the generic name *Achyranthes*, ibid. 73–74 (1957).

Bullock, A. A. & Killick, D. J. B. On the typification of *Plectranthus*, Taxon 6: 239. 1957.

Dandy, J. E. &. Taylor, G. Two new British hybrid Pondweeds, in Kew Bull. 1957: 332 (1957).

Dennis, R. W. G. Some Xylarias of Tropical America, in Kew Bull. 1956; 401–444 (1957); Further Notes on Tropical American *Xylariaceae*, in Kew Bull. 1957: 297–332 (1957).

Dennis, R. W. G. & Reid, D. A. Some Marasmioid Fungi allegedly parasitic on leaves and twigs in the tropics, in Kew Bull. 1957: 287–292 (1957).

Elffers, J. & Kennedy-O'Byrne, J. Notes on African Grasses: XXIV. *Richardsiella*, a new genus of grasses from Tropical Africa, in Kew Bull. 1956: 455–462 (1957).

Graham, R. A. A revision of *Oxygonum* (Polygonaceae—Polygoneae), in Kew Bull. 1957: 145–172 (1957); Notes on African *Rosaceae*: I, in Kew Bull. 1957: 229–231 (1957); A new species of *Oxygonum*, in Kew Bull. 1957: 236 (1957); Flora of Tropical East Africa, *Orobanchaceae* (1957).

Harrison, S. G. Identification and Botanical Characteristics of some Poisonous Plants in Clinical Toxicology. S. Locket. 1957, 676–711: The Classification of Plants, in Perfumery and Essential Oil Record, 48 (2): 56–58 (1957): Botanical Names in Plants, *l.c.* 48 (4): 159–161 (1957).

Howes, F. N. New Fruits in The New Scientist, No. 9, 32–34 (1957).

Kennedy-O'Byrne, J. Notes on African Grasses: XXIX. A new species of *Eleusine* from Tropical and South Africa, in Kew Bull. 1957: 65–72 (1957).

Marsden-Jones, E. M. & Turrill, W. B. The Bladder Campions (*Silene maritima* and *S. vulgaris*), pp. 374 (1957).

Meikle, R. D. Notes on the Flora of Cyprus: I, in Kew Bull. 1956: 545–549 (1957).

Melville, R. *Encephalartos* in Central Africa, in Kew Bull. 1957: 237–257 (1957). Some taxonomic implications of Turing's reaction-diffusion theory of morphogenesis, in Bull. Jard. Bot. Brux. 27: 289–300 (1957). A new *Frankenia* from South Australia, in Trans. Roy. Soc. S. Austral. 80: 144–145 (1957). *Abies amabilis*, in Bot. Mag. t.306 (1957).

Metcalfe, C. R. Some Thoughts on the Structure of Bamboo Leaves. Bot. Mag. Tokyo, 69 (Ogura Commemoration No.) Part 1: 391–400: (1956); *Scyphostegia borneensis* Stapf: Anatomy of Stem and Leaf in Relation to its Taxonomic Position. Reinwardtia, 4: 99–104 (1956).

Bate-Smith, E. C. & Metcalfe, C. R. Leuco-anthocyanins 3. The Nature and systematic Distribution of Tannins in dicotyledonous Plants. J. Linn. Soc. Bot. 55: 669–705 (1957).

Milne-Redhead, E. *Heywoodia lucens* Sm. A tree new to Tropical Africa, in Bull. Gard. Bot. Brux. 27: 327–333 (1957).

Nelmes, E. Notes on *Cyperaceae*: XLI. Rhynchospora in Tropical East Africa, in Kew Bull. 1956: 533 (1957).

Reid, D. A. New or Interesting Records of Australasian Basidiomycetes: II, in Kew Bull. 1956: 535–540 (1957); New or Interesting Records of Australasian Basidiomycetes: III, in Kew Bull. 1957: 127–143 (1957); New or Interesting Records of British *Ustilaginales* in Trans. Brit. Mycol. Soc. 40: 193–199 (1957); The Taxonomy of *Stereum traplianum* Velenovsky, in Trans. Brit. Mycol. Soc. 40: 200–202 (1957); The Fungi of Hertfordshire. Supplement 3, in Trans. Herts. Nat. Soc. 24: 230–236 (1957).

Russell, T. A. The Lagos Botanic Station, a forgotten Garden, in The Nigerian Field, 22 (3): 130–135 (1957).

Sandwith, N. Y. *Bignoniaceae* in J. A. Steyermark's Contributions to the Flora of Venezuela, 4, in Fieldiana (Botany), 28: 1088–1092 (1957); *Bignoniaceae* in B. Maguire and J. J. Wurdack, Botany of the Guayana Highlands, pt. 2, in Mem. N.Y. Bot. Gard. 9: 359–366 (1957).

Sealy, J. R. The Roxburgh Flora Indica Drawings at Kew, Part 2, in Kew Bull. 1956: 349–399 (1957).

Summerhayes, V. S. African Orchids: XXIV, in Kew Bull. 1957: 107–126 (1957); Notes on Asiatic Orchids: II, in Kew Bull. 1957: 259–268 (1957); The Genus *Eulophidium* Pfitz., in Bull. Jard. Bot. Brux. 27: 391–403 (1957).

Turrill, W. B. The Subjective Element in Plant Taxonomy, in Bull. Jard. Bot. Brux. 27: 1–8 (1957).

Royal Botanic Gardens, Kew
Scientific and Administrative Staff

31st December, 1957

Director

Dr. George Taylor, D.Sc., F.R.S.E., F.L.S., V.M.H.

Assistant Director

N. L. Bor, C.I.E., O.B.E., M.A., D.Sc., F.L.S.

HEAD OFFICE

Establishment Officer—J. H. Crossman.

Clerical Officer/Secretary—Mrs. A. M. E. Kendall.

Clerks—Mrs. L. A. Kell.
Miss C. M. Newall.

Telephone Operator—Miss J. Lane.

HERBARIUM AND LIBRARY

Keeper (S.P.S.O.)—C. E. Hubbard, O.B.E., F.L.S.

Principal Scientific Officers—V. S. Summerhayes, B.Sc.
F. Ballard, B.Sc.
N. Y. Sandwith, M.A., F.L.S., F.R.G.S.
E. W. B. H. Milne-Redhead, T.D., M.A., F.L.S.
R. Melville, B.Sc., Ph.D., F.L.S.
R. W. G. Dennis, B.Sc., Ph.D.
A. A. Bullock, B.Sc., F.L.S.
J. B. Gillett, M.A., F.L.S. (Colonial Office).
J. P. M. Brenan, M.A., B.Sc., F.L.S.
J. R. Sealy, B.Sc., F.L.S.

Senior Scientific Officer— R. D. Meikle, B.A., LL.B., F.L.S.

Scientific Officers— F. N. Hepper, B.Sc., F.L.S.
D. A. Reid, B.Sc.
L. L. Forman, B.Sc., F.L.S.
C. Jeffrey, B.A. (Colonial Office).
R. A. H. Graham, M.A., F.L.S. (Colonial Office).
D. H. Dalby, B.Sc., Ph.D.
N. K. B. Robson, B.Sc., Ph.D. (Colonial Office).

Senior Experimental Officers—	E. Nelmes, F.L.S. R. A. Blakelock, B.Sc., F.L.S.
Experimental Officers—	Miss C. I. Dickinson, M.A., Dip Agric. P. G. Taylor, F.L.S. J. K. P. Kennedy-O'Byrne, F.L.S. J. R. Tennant, B.Sc., F.L.S. (Colonial Office). Miss S. S. Hooper, B.Sc. (National *Dianthus* collection). Miss M. I. Skan (Index Kewensis).
Assistant Experimental Officers—	Miss S. Carter, B.Sc. (Colonial Office). Miss B. J. Willoughby, B.Sc. P. G. Wilson, B.Sc.
Senior Assistant (Sci.)—	Miss J. Forster.
Assistants (Sci.)—	Miss I. Blewett. Miss D. B. Cousins (Colonial Office). P. J. Darbyshire. Miss A. D. Dunk. Miss J. L. M Fletcher. J. L. Gilbert (Colonial Office). Miss P. Halliday. Miss J. E. Hawkins (Index Kewensis). Miss A. James (Colonial Office). Mrs. P. Z. Kennedy-O'Byrne (Colonial Office). Miss J. McEwan. Miss D. Moscoff (Colonial Office). M. J. S. Sands (Flora of 'Iraq). A. L. G. Sapper. Mrs. O. F. Tait. Miss A. C. Uchlein.
Visiting Botanist—	W. Marais, M.Sc. (South Africa).
Librarian—	H. S. Marshall, F.L.S.
Assistant Librarians—	K. J. Churches, A.L.A. Miss D. M. Jepson, A.L.A.
Clerks (Library)—	Mrs. P. L. Irving. Miss M. Kierans.
Library Assistant—	Miss M. C. Davey (Bentham-Moxon).
Hon. Associate (Transplant & Breeding Experiments)—	E. M. Marsden-Jones, F.L.S., F.R.E.S.
Artists—	G. Atkinson, A.L.S. Miss Stella Ross-Craig, F.L.S. (Bentham-Moxon).

Preparer (Supervisor)—	Mrs. H. Wootton.
Preparers—	Miss D. J. Bowman. Mrs. H. Dzilna. Miss I. E. Farrow. Mrs. L. C. F. Glenister. Mrs. I. H. Kingerley. Mrs. J. M. Lines. Mrs. D. J. Mitchell. Mrs. J. E. Pizzala. Mrs. K. Watts.
Temporary Technical Asst.—	Miss E. Chilton (Bentham-Moxon). Miss J. D. M. Pearson, G.C. (Bentham-Moxon).
Clerks—	E. E. Cope. P. Heawood. Miss G. M. Pring. Miss F. V. Surplice.
Shorthand Typists—	Mrs. E. Jones. Mrs. H. M. Skews (Colonial Office).
Typists—	Mrs. M. Brind. Mrs. B. F. Saunders. Miss I. L. Taylor (Colonial Office). Miss L. D. Whiteley (Colonial Office).

JODRELL LABORATORY

Keeper (P.S.O.)—	C. R. Metcalfe, M.A., Ph.D., F.L.S.
Scientific Officer—	Miss M. Y. Stant, B.Sc., Ph.D.
Experimental Officer—	F. Richardson.
Assistant (Sci.)—	Miss D. M. Catling.
Photographer—	R. R. Zabeau.

DEPARTMENT OF ECONOMIC BOTANY.

Keeper (P.S.O.)—	F. N. Howes, D.Sc.
Senior Scientific Officer (Quarantine Work)—	T. A. Russell, B.Sc., A.R.C.S., A.I.C.T.A.
Senior Scientific Officer—	S. G. Harrison, B.Sc.
Scientific Officer—	Miss B. J. Youngman, B.Sc.
Assistant (Sci.)—	Miss J. K. Bowden.
Preparer—	L. J. Harding.
Typist—	Miss V. Horwill.

GARDENS

Curator—	W. M. Campbell, N.D.H., F.Inst.P.A., V.M.H.
Assistant Curators—	L. Stenning, A.H.R.H.S. (Tropical). S. A. Pearce, F.Inst.P.A. (Arboretum North) J. E. S. Souster, N.D.H., F.L.S. (Temperate). G. E. Brown, N.D.H. (Arboretum South). G. H. Preston, F.L.S. (Herbaceous). S. W. Rawlings (Decorative).
Foreman Gardeners—	A. G. Cook (Herbaceous and Rock Garden). G. Nicholson (Orchids—Tropical). H. Bruty (Ferneries—Tropical). F. Larkbey (Decorative). W. Bridle (Temperate). G. C. W. Gardner (Arboretum North). P. G. Shutler (Arboretum South). H. Collin (Quarantine House) (Colonial Office). W. A. Mullins (Dianthus Collection). G. H. Anderson (Palm House). A. J. Hale (Temperate House). N. Hickman (Tropical Pits). R. J. Chuter (Propagator).
Executive Officer—	E. G. Dunk.
Clerks—	W. D. H. Prior. G. F. Lamb. Miss E. Mates.
Shorthand Typist—	Miss A. G. Barton.
Typist—	Miss M. Sillitoe.

CONSTABULARY

Sergeant in Charge—	W. Leaver.

Dr. W. B. Turrill,
O.B.E., D.Sc., F.R.S., F.L.S., V.M.H.

Dr. Turrill handed over charge of the post of Keeper of the Herbarium to Mr. C. E. Hubbard, O.B.E., on 1st October, 1957, and thus his official connection with the Royal Botanic Gardens which had begun forty-nine years before came to an end.

Dr. Turrill was born at Woodstock, Oxfordshire, in 1890 and was educated at the Oxford High School, where he was a contemporary of a boy who later became famous as Lawrence of Arabia. As a young man of sixteen he entered the Fielding Herbarium of the Botanical Department of the University of Oxford, and there his early taste for botany was stimulated and developed. In 1909 he came to Kew as a Temporary Assistant in the Herbarium and in 1915 became a permanent member of the Staff. During his early years at Kew Dr. Turrill attended classes at the Chelsea Polytechnic with a view to broadening his botanical knowledge and to taking a science degree at London University. The latter ambition was achieved by his success in the B.Sc. examination in 1915, with first class honours. An M.Sc. followed in 1922 and the coveted D.Sc. in 1928.

During the first world war Dr. Turrill joined the forces in 1915 and saw active service in Macedonia. In this area, which only periodically erupted into ferocity, he was able to devote what little spare time he had to the geography, geology and botany of Greece. After the war his knowledge of the flora was augmented by travel through the Balkan States, Bulgaria, Serbia, Albania and Macedonia. He became an acknowledged authority on the flora of this area and his book 'Plant Life of the Balkan Peninsula', published by the Clarendon Press, Oxford, in 1929, contains an exhaustive account of the vegetation.

His appointment in 1946 to the Keepership of the Herbarium, with its responsibilities, was the culmination of a career which has been characterised by hard work, wide reading and the study of scientific taxonomy in its broader aspects. He assumed the post of Keeper at a time of extreme difficulty—a period of reconstruction in which Britain was endeavouring to return to normal life. Among his first tasks were the plans for the return of those portions of the Herbarium which had been dispersed during the war and the re-organisation of the Staff on the basis of the recommendations of the Barlow Committees.

This is not the place to assess Dr. Turrill's scientific work—happily his output is likely to be materially increased now that he has been freed from the burden of office, but a few general remarks on his published work to date may be permitted. In over 500 publications in his own name and in over 70 in collaboration with others he has covered a field which, in these days of specialisation can only be termed remarkable. Genetics, cytology, classical taxonomy, modern experimental taxonomy, ecology, plant geography and the philosophy of taxonomy have all been enriched by original contributions from his pen.

Apart from the book on the plant life of the Balkan Peninsula already mentioned he has published British Plant Life (New Naturalist Series), of

which a second edition is in preparation, Pioneer Plant Geography (Lotsya —A Biological Miscellany Vol. 4) and, with Marsden-Jones, the new systematics of the British Knapweeds and the Bladder Campions.

He has been editor of Curtis' Botanical Magazine since 1947, and for his services in this connection the Royal Horticultural Society awarded him the Veitch Memorial Medal in 1953. For his services to horticulture he received the Victoria Medal of Honour, from the same body in 1956.

In the administration of botany he has made similar contributions. He has been President of the British Ecological Society, President of Section K, British Association for the Advancement of Science, and has served on the Councils of the British Ecological Society, the Genetical Society and the Linnean Society, and has been Chairman of the Systematics Association. In recognition of his eminent services to British botany he has been elected an honorary member of the Botanical Society of the British Isles. This year he is to deliver the Hooker lecture to the Linnean Society.

For his distinguished services as a member of the Scientific Civil Service, he was created an officer of the Order of the British Empire in 1955 by Her Majesty the Queen. He was elected a Fellow of the Royal Society in 1958.

Dr. and Mrs. Turrill take with them the good wishes of their many friends for a long, happy and tranquil retirement. Both of them will be long remembered at Kew which they loved and served so well.

Growing African Violets.*—The author of this book began to grow African violets whilst in Canada with her husband some years ago. On their return to England they continued to cultivate these charming little plants and as a result of much practical experience in growing them in an ordinary dwelling house, Mrs. Milsted has produced the present work. It contains valuable information on the cultivation, propagation, pests and diseases, and details of equipment for use in the cultivation of these attractive plants in the home. The book is nicely illustrated with photographs and line drawings.

H. S. MARSHALL.

* Growing African Violets in the Home. By Muriel F. Milsted. London: W. H. & L. Collingridge Ltd., New York: Transatlantic Arts Inc. 1958. Pp. 80. Price 18/-.

Notes on African Capparidaceae: I

R. A. Graham

An overlooked species of Cleome.

Cleome stricta (*Klotzsch*) *R. A. Graham, comb. nov.*

Syn. *Symphyostemon strictus* Klotzsch in Peters, Mossamb. Bot. 1 : 158 (1862). Type : Mozambique, *Peters* s.n. (B, holo. !)

During investigation of *Cleome* for the Flora of Tropical East Africa, it was noticed that the material (K, BM, EA) previously named as *C. strigosa* (Boj.) Oliv. seemed to consist of two species, indeed this was so clearly suggested that it was possible easily to sort the specimens into two groups without the aid of a lens or other artificial means. The two groups, A and B (below), are distinguishable as follows :—

A.	*B.*
Leaflets of lower leaves 5–7	Leaflets of lower leaves 5 only
Sepals (5–) 11–12 mm. with a long, wavy, caducous, blackish-red apex ; very glandular ; with or without only a few strigillose hairs	Sepals 5–6 mm. long, green throughout, without a caducous apex ; glands absent or only few ; many strigillose hairs present
Petals large, 16–19 mm. long, pale rose-pink or nearly white when dried	Petals smaller, 7–13 mm., deep pink when dried
Gynophore of mature capsule (1–) 2–2·5 cm. long	Gynophore 0·5–1 cm. long
Mature capsule (3·5–) 5–7 cm. long, glabrous or essentially so	Capsule 2–3·5 cm. long, the valves distinctly strigillose-pubescent

The description of *Cleome strigosa* in the Flora of Tropical Africa is misleading as it appears to embrace plants combining the different sets of characters given above, but this is scarcely surprising since Oliver indicates his having framed his text upon Bojer's Zanzibar specimen, which is at Kew, and that of Peters, from Mozambique, which happily is still at Berlin, and Bojer's plant is the true *Cleome strigosa*, to which examples with the characters under B above are referable, while those with the characters as given under A should be referred to *Symphyostemon strictus* Klotzsch (of which Peters' specimen is the holotype), here newly recombined with *Cleome*. It is a little surprising that Oliver, even with the material available at the time, detected no important difference between these two, and perhaps even more so that Gilg and Benedict were prepared, in their Monograph of *Capparidaceae* (Engl., Jahrb. 53 (1915)) to let Peters' species remain in synonymy.

In addition to the characters given above there is a tendency, at any rate in the Tanganyika–Zanzibar specimens, for the leaflets of *C. stricta* to be obtusely pointed rather than rounded, indeed this is a feature of the typical plant : in typical *C. strigosa* the apex is rounded varying to emarginate. On the other hand examples of *C. stricta* from Portuguese

East Africa, where *C. strigosa* seems to be absent, show leaflets with apices sometimes far more like those of the latter. In this area, too, the sepals of *C. stricta* often appear to be shorter than in those specimens from Tanganyika–Zanzibar, but the caudate apex is easily broken away, and in many cases it is clear that this has happened. In one example (Torre 2299 (BM !)) the dark, filiform apex seems to be wholly absent. The mature capsules of Portuguese East African *C. stricta* are often rather shorter than in more northern examples where the minimum length is about 5 cm., but are nevertheless not less than 3·5 cm. long which represents the maximum length for *C. strigosa*. There is therefore a certain intermediacy in characters in some of the more southern examples of *C. stricta* and this, if the two species are to be upheld as different, requires at least a suggested explanation. Staminodes have not been seen in *C. strigosa*, but they occur (2–3) at any rate sometimes in *C. stricta*.

C. strigosa is a coastal plant, of marine sands above high water mark, ranging from Somaliland to Tanganyika (including Zanzibar and Pemba). Its southern limit appears from our records to be in the general latitude of these islands. *C. stricta*, of exactly similar habitat, extends from Zanzibar and Mafia Island southwards (without so far any records from the Tanganyikan mainland) to Portuguese East Africa. Thus Zanzibar is the only *locale* known at present where the two species grow together, and it is here that they are most distinguishable in character. If hybrids occur at all, it is here where they would be expected, but yet have apparently not been collected. How then should we explain the apparently intermediate plants from Portuguese East Africa where hybridity—in the absence of one of the two possible parents—is difficult to account for unless we assume the existence of a hybrid swarm which has replaced one of its progenitors which has died out. The more likely explanation is that whereas *C. strigosa* is a species of comparative stability in character, *C. stricta* is far more plastic and that certain of its features embrace, by variation, the characters of *C. strigosa*. It is possible that *C. stricta* itself arose originally as a hybrid of which one parent was *C. strigosa*, although its abundant seed seems fertile. Peters' Mozambique specimen is the form found in Zanzibar so far as examples from this island show. The answer to the problem lies primarily with the collector, to establish the exact ranges of *C. strigosa*, of *C. stricta*, and of the two apparent forms of the latter. Only *C. strigosa* appears to occur in the Mascerene Islands.

The Grain Sorghums

Copies of this authoritative work by J. D. Snowden are still available. Application should be made to the Bentham Moxon Trustees, Royal Botanic Gardens, Kew, Richmond, Surrey. The price of this book, indispensable to all agricultural officers in the tropics, is only 10/6d., postage extra.

A Key to West Indian Mangroves

William T. Stearn

The woody species which constitute the main elements of mangrove vegetation along protected shores, on sandspits, reefs and the mud of estuaries, and in the brackish water of lagoons, throughout the West Indies, belong to the genera *Rhizophora* (Rhizophoraceae), *Avicennia* (Verbenaceae or, if segregated, Avicenniaceae), *Laguncularia* and *Conocarpus* (Combretaceae). Those growing on mud build up new land by catching and holding silt within their dense exposed root-systems and by depositing peat. They help to hold back the sea, but cannot stand up to violent wave action. Some of them provide tanning material. In former times, when big trees were available, their timber, particularly the strong durable wood of the red mangrove, was valued for house construction and boat building; nowadays it supplies charcoal and timber for smaller work. Properly exploited, mangroves can have a high economic value, and L. R. Holdridge, writing in 1940 (Caribbean Forester, 1 no. 4: 19–29) on the mangrove swamps or manglones of Puerto Rico, stated that 'probably no other forest areas in Puerto Rico have been as productive in cash crops as these'; Holdridge summarizes the information available. Detailed accounts of the ecology of the Jamaican species will be found in V. J. Chapman's papers on the botany of the Jamaica shoreline in Geogr. J. 96: 312–323 (1940) and J. Linn. Soc. London, Bot. 52: 407 447 (1944). J. H. Davies deals with the mangrove swamps of Florida, their ecology and geologic role, in Publ. Carnegie Inst. Washington, 517 (1940). Guppy has discussed the dispersal of *Rhizophora mangle* and its occurrence, with special reference to Jamaica, in his Plants, Seeds and Currents in the West Indies and Azores (1917).

Technically the mangrove species are to be distinguished by the floral characters used for the classification of their families, but in practice they can be recognised without reference to these. For specialized communities, with a limited number of species, keys based on easily observed characters present at most or all seasons help the forester or ecologist better than those based on more fundamental characters evident only in flowering material which may be difficult to obtain and available only for a limited time. The distribution of mangrove species in the West Indies is imperfectly known, probably because they are locally so abundant as to seem unworthy of collecting and study, and the following key aims to further investigation of them. In Kew Bulletin, 1953: 121–127 R. W. J. Keay elucidated the taxonomy and nomenclature of the *Rhizophora* species occurring on both tropical African and American sides of the Atlantic Ocean. In Lilloa, 4: 333–338 (1939) H. N. Moldenke described in detail the two West Indian species of *Avicennia*; the enumeration below deals primarily with their nomenclature.

Key to the main species of mangrove in the West Indies and north-east South America

Leaves alternate; tip sharply long-pointed. Fruits about 7 mm. (3/10 in.) long, densely clustered to form a rounded cone-like head 7–14 mm. (3/10–6/10 in.) long. No prop- or stilt-roots or pencil-like pneumatophores. (Button Mangroves; family Combretaceae).

Leaves glabrous or almost so . . . . . *Conocarpus erectus* (v. *erectus*)

Leaves covered with silky hairs . . . . . *C. erectus* v. *sericeus*

Leaves opposite; tip rounded, blunt or acute. Fruits larger, solitary or in a loose spike or cyme, not forming rounded heads.

Leaves usually with a close grey hair-covering beneath, ascending. Fruit laterally compressed, broadly ovate. Flowers densely crowded at tips of peduncles, the whole inflorescence often paniculate. Pencil-like pneumatophores arising out of mud around bush or tree. Stamens 4. (Black Mangroves; family Verbenaceae).

Leaves mostly acute at tip. Corolla-lobes tomentose on both sides. Style elongated . . . . . *Avicennia germinans*

Leaves mostly rounded at tip, sometimes acute. Corolla-lobes glabrous inside, tomentose outside. Style very short, the stigma hence almost sessile . . . . . *A. schauerana*

Leaves always glabrous below, spreading. Fruit not as above. Stamens 8–10.

Leaves often slightly notched at tip. Inflorescence a many-flowered spike. Petals 5, whitish, very small, soon falling. Fruit narrowly obovate (pear-shaped) in outline, with two narrow wings or ribs, 1·5–2 cm. (about 7/10 in.) long, scarcely viviparous, the small calyx persistent on its tip. Pneumatophores often present but not stilt-roots. (White Mangrove; family Combretaceae)
Laguncularia racemosa

Leaves not notched at tip. Inflorescence cymose (forked). Petals 4, yellow, fleshy, about 8 mm. (3/10 in.) long. Fruit narrowly conical, not winged, 2–5 cm. (4/5–2 in.) long, with a prominent reflexed calyx at its base and a long club-shaped radicle (root) growing downwards from it while on the tree. Prop- or stilt-roots growing from stems, curving outwards and downwards. (Red Mangroves; family Rhizophoraceae).

Inflorescence normally 2-flowered (rarely 3–4-flowered)
Rhizophora mangle

Inflorescence several- or many-flowered, much branched.

Pedicels 6–10 mm. (1/5–2/5 in.) long. Flower buds acute at tip. Radicle seldom more than 20 cm. (8 in.) long while still on the the tree . . . . . *R. harrisonii*

Pedicels 3–4 mm. (less than 1/5 in.) long. Flower buds blunt at tip. Radicle reaching a length of 30–60 cm. (1–2 1/5 ft.) while still on the tree . . . . . *R. racemosa*

Enumeration of species

Avicennia germinans (*L.*) *Stearn*, comb. nova.

Basionym: *Bontia germinans* L., Syst. Nat., ed. 10, **2**: 1122 (1759).

Other synonyms: *Avicennia nitida* Jacq., Enum. Pl. Carib. 25 (1760)—*A. tomentosa* Jacq., loc. cit. (1760)—*A. floridana* Raf., Atlantic J. **1**: 148 (1832)—*A. floridana* Gandoger in Bull. Soc. Soc. Bot. France, **65**: 64 (1918).

Restricted type-locality: Jamaica.

The name *Bontia germinans* was first published by Linnaeus in his Systema Naturae, ed. 10 (May–June 1759) with a brief diagnosis:—'B. fol[iis] oppositis, pedunculis spicatis. *Brown. jam.* 263. *Loefl. hisp.* 193'. Thus at its first publication the name rested entirely upon tropical American material, Browne's from Jamaica, Löfling's probably from Cumaná, Venezuela. Linnaeus's reference to the detailed account given by Patrick Browne, Nat. Hist. Jamaica, 263 (1756) of the 'Olive Mangrove Tree*** frequent near the sea, both on the north and south side of Jamaica; and remarkable on account of its cineritious colour, and the narrow form of its leaves' is supported by a specimen from Browne in the Linnaean Herbarium (813.2.) and establishes the name as referring to the common Jamaican *Avicennia* usually known by the later name *A. nitida* Jacq. Browne stated that 'its capsules are compressed, and somewhat roundish; but irregular, and obliquely lengthened; and contain each a compressed foliaceous seed, that swells and germinates before it falls'. From this observation and Browne's description, 'semen unicum quadrilobum germinans, lobis foliaceis', Linnaeus took the appropriate epithet *germinans*. The description in Löfling's Iter Hispanicum, 193 (1758), under *Bontia*, does not allude to this viviparous habit. Hence it is reasonable to typify the name *Bontia germinans* by Browne's specimen in the Linnaean Herbarium. Abundant herbarium material from Jamaica is now available (Fig. 1). In the second edition of the Species Plantarum, 2: 891 (1763)

Fig. 1. Distribution of *Avicennia germinans* in Jamaica

Linnaeus's concept of *Bontia germinans* expanded to include the *Avicennia officinalis* of the first edition, 1: 110 (1753); the distribution "in Indiis" thus covers both the East and the West Indies. Linnaeus nowhere published the name *Avicennia germinans* attributed to him in synonymy by R. C. Bakhuizen van den Brink in Bull. Jard. Bot. Buitenzorg, III. 3: 218 (1921) and by Moldenke in Lilloa, 4: 337 (1939).

The name *A. officinalis* L. is to be typified by the Indian plant which is represented as "Oepata" in Rheede's Hortus Indicus Malabaricus 4: t. 45 (1683), the restricted type-locality for this being the coast of Cochin, southern India. Whereas the West African *A. africana* Beauvois appears to be conspecific with the American *A. germinans*, the East African *Avicennia* is specifically distinct, its correct name being *A. marina* (Forsk.) Vierh., based on *Sceura marina* Forsk., and its type-locality the Red Sea. The species described as "*A. officinalis* L." by K. Biswas in Notes R. Bot. Gard. Edinburgh, 18: 163 (1934) is *A. marina* and the plants described by him as "*A. tomentosa*

Jacq." is *A. officinalis* as defined by Bakhuizen. Unfortunately when preparing his comparative study of the Indian species of *Avicennia*, Biswas overlooked Bakhuizen's revision of the whole genus published in 1921.

Avicennia schauerana *Stapf & Leechman ex Moldenke* in Lilloa, **4**: 336 (1939), as *Schaueriana*.

Basionym: "*A. tomentosa* Jacq." sec. Schauer in DC., Prodr. **11**: 699 (1847), in Mart., Fl. Brasil. **9**: 305 (1851); non Jacq.

Restricted type-locality: Brazil; Schauer recorded it from many places in 'littoribus paludosis Americae tropicae'.

This is one of the species to which the name *Avicennia tomentosa* has been erroneously applied, the Asiatic *A. officinalis* being another. When, in 1939, Moldenke published the manuscript name *A. schaueriana* attached to specimens in the Kew Herbarium, he did not make clear its history. From a long unpublished memorandum written by Otto Stapf in 1917 it appears that the receipt of notes and of specimens collected by Alleyne Leechman near Georgetown, British Guiana led Stapf to investigate the application of the name *A. tomentosa* Jacq. He concluded that 'Jacquin meant by his *A. tomentosa* a state of *A. nitida* with obtuse and rather broad leaves whitish underneath.*** Whether he ever came across the "*A. tomentosa*" of Schauer (Flora Brasiliensis) is more than doubtful. The smaller flowers with their inside glabrous corollas and short styles would have struck him as distinct from those of *A. nitida* which he figures correctly. This "*A. tomentosa* Schauer, non Jacq. nec. aliorum" has no name.*** It seems to me that Schauer having given first a correct description of this plant, *A. schaueriana* would be a convenient and appropriate name for it'. Although Schauer cited *Avicennia elliptica* Thunb., Pl. Brasil. Decas Tertia, 37 (1821) in synonymy, Thunberg's diagnosis 'foliis ellipticis, acuminatis' excludes it. In a letter of February 1917 Leechman stated that 'in addition to the broad leaves and subsessile stigmas other points of difference from typical *A. nitida* are (a) stamens not projecting beyond mouth of corolla tube, (b) inflorescence less condensed, (c) fruit pale sap green, very seldom with a purple tinge, (d) fruit flatter and more pointed than in *A. nitida*, also considerably smoother, (e) corolla lobes not reflexed. In *A. nitida* the fruit frequently turns almost plum-coloured where exposed to the sun, and the corolla lobes are finally bent back till they touch the tube, when the blackened anthers and the projecting bilobed stigma become very conspicuous.'

Conocarpus erectus *L.*, Sp. Pl. **1**: 176 (1753); Britton & Wilson, Bot. Porto Rico, **6**: 23 (1925); Fawcett & Rendle, Fl. Jamaica, **5**: 309 (1926).

C. erectus var. **erectus.**

Restricted type-locality: Jamaica; Linnaeus stated 'Habitat in Jamaicae, Bermudensium, Brasiliae maritimis'. Material collected by Houstoun, possibly of the same gathering as that on which Linnaeus founded the genus *Conocarpus*, is in the British Museum (Natural History).

C. erectus var. **sericeus** *Griseb.*, Fl. Brit. W. Indies, 277 (1860); Fawcett & Rendle, loc. cit. 310 (1926). Synonym: *C. sericeus* (Griseb.) Jimenez in An. Univ. Santo Domingo, **65–66**: 726 (1953).

Type-locality: Antigua or St. Vincent, Lesser Antilles. Material intermediate between *erectus* and *sericeus* (e.g. *Stearn* 760 from Portland Ridge, Clarendon, Jamaica) makes specific rank for the latter unacceptable; it is best regarded as a form.

Laguncularia racemosa (*L.*) *Gaertner f.*, Fruct. et Sem. **3**: 209 (1807); Britton & Wilson, Bot. Porto Rico, **6**: 24 (1925); Fawcett & Rendle, Fl. Jamaica, **5**: 310 (1926).

Basionym: *Conocarpus racemosa* L., Syst. Nat., ed. 10, **2**: 930 (1759), Sp. Pl., ed. 2, **1**: 251 (1762).

Type-locality: Jamaica.

Rhizophora harrisonii *Leechman* in Kew Bull. **1918**: 8 (1918); Keay in Kew Bull. **1953**: 124 (1953).

Type locality: British Guiana, on a two mile stretch of the coast in the immediate neighbourhood of Georgetown, at the estuary of the Essequibo River.

Rhizophora mangle *L.*, Sp. Pl. **1**: 443 (1753) p.p.; Keay in Kew Bull. **1953**: 123 (1953).

Restricted type-locality: Jamaica; Linnaeus recorded it as growing 'in paludibus Caribaeum, Malabariae'.

This, the red mangrove, is the only species of *Rhizophora* known in Jamaica. It is the pioneer colonist of brackish lagoons and muddy shores, the viviparous fruits rapidly producing seedlings which anchor themselves by prop-roots and grow outwards into dense thickets; hence it occupies the seaward side of a mangrove formation. On the landward side in the shallow water behind the zone of red mangrove (*Rhizophora mangle*), the black mangrove (*Avicennia germinans*) tends to predominate; this and the white mangrove (*Laguncularia racemosa*) are characteristic of swamps, whereas the button mangrove (*Conocarpus erectus*) grows only on the landward side under comparatively dry conditions, although it can stand salt-spray. According to Holdridge's observations in Puerto Rico, the white and black mangroves grow again from stumps whereas the red does not; hence human interference favours the black mangrove against the red.

The red mangrove can reach a height of 60 feet but trees so tall have become so rare that where they occur it should be a matter of local pride to preserve them.

Rhizophora racemosa *G. F. W. Meyer*, Primit. Fl. Essequeb. 185 (1818); Keay in Kew Bull. **1953**: 125 (1953).

Type-locality: British Guiana, at the estuary of the Essequibo River.

Ninth International Botanical Congress

The Ninth International Botanical Congress will be held in Montreal, Canada, from August 19 to 29, 1959, at McGill University and the University of Montreal, and will be preceded by sessions of the Bureau of Nomenclature from August 16 to 19.

Programme

The programme of the Congress is being organized and tentatively includes the following sections:

General Systematics (including special problems) and Phylogeny
Taxonomy and Geography of Vascular Plants
Phycology
Mycology (including Medical Mycology)
Phytopathology (including Virology)
Bryology
Lichenology
Microbiology
Morphology and Anatomy
Paleobotany
Physiology
Ecology
Cytology and Genetics
Forest Botany
Ethnobotany and History of Botany
Nomenclature

Field Trips

Tentative plans are being made for the field trips outlined below. Depending on the interest shown and on other developments before the Congress it is possible that some of these may be cancelled or two or more trips may be merged. Some further specialist tours may be added. There will also be a number of short trips while the Congress is in session.

The costs shown are current estimates and are subject to revision. For certain trips, as indicated, members will have to provide the cost of transportation between Montreal and the site of the trip and return. Some members will be able to reduce or eliminate this cost by integrating travel to the site of the trip with travel to and from the Congress.

Pre-Congress Trips

1. *British Columbia.* Nine days general tour plus five days of concurrent specialist trips in phycology, forest botany, paleobotany, and floristics. Revelstoke-Okanagan-Vancouver-Vancouver Island. Aug. 1–14. $150 (plus $275 to $335 for transport Montreal to Vancouver and return).

2. *Rockies.* Ten days; alpine and subalpine flora. Banff–Jasper. July 20–30. $150 (plus $220 to $270 for transport Montreal to Calgary and return).

3. *Alberta–Saskatchewan.* Eleven days; ecology of grasslands of foothills and prairies. Calgary–Lethbridge–Waterton–Cypress Hills–Swift Current–Saskatoon. Aug. 1–11. $125 (plus $220 to $270 for transport Montreal to Calgary and return Saskatoon to Montreal).

The Identity of Acacia horrida (L.) Willd.

DOROTHY HILLCOAT and J. P. M. BRENAN

Acacia horrida (L.) Willd. was based on *Mimosa horrida* L., Sp. Pl. 521 (1753). Linnaeus's account of *Mimosa horrida* is as follows :—

"27. Mimosa spinis oppositis longitudine foliorum, foliis bipinnatis : partialibus bijugatis.

Acacia maderaspatana, foliis parvis, aculeis e regione binis praegrandibus horrida, cortice cinereo. Pluk. alm. 3. *t.* 121. *f.* 4.

Habitat in India ♄."

This appears to be one of those unfortunately rare cases where only one element composed Linnaeus's conception of a species.

Afterwards confusion started, not surprisingly with so inadequate an original description. Vahl, Symb. Bot. **1,** 81 (1790), wrongly identified with *Mimosa horrida* a distinct Arabian species, *Mimosa orfota* Forsk. (i.e. *Acacia orfota* (Forsk.) Schweinf.). Then, in Sp. Pl. **4,** 1082 (1806), Willdenow transferred *M. horrida* to *Acacia* and enlarged its description, citing in its synonymy *M. orfota* and *M. leucacantha* Jacq., Hort. Schoenbr. **3,** p. 75, t. 393 (1798), the latter being a South African species. Willdenow wrote of *A. horrida* "habitat in Africa", its occurrence in Arabia or India being neglected. In this way, *Acacia horrida*, originally based on an Indian plant, was gradually accepted as the correct name for a common South African acacia. In this sense the name was used by Harvey in the Flora Capensis, **2,** 281 (1862) and by Bentham in his great revision of *Mimoseae* in Trans. Linn. Soc. **30,** 507 (1875). Subsequently it was realised by certain authors, e.g. Burtt Davy in Kew Bull. **1922,** 328 (1923) and in Fl. Transvaal 346 (1932), and E. G. Baker, Leg. Trop. Afr. 843 (1930), that the South African plant, for which they correctly used the name *A. karroo* Hayne, could not be conspecific with *A. horrida*. The confusion, as far as South Africa was concerned, was finally cleared away by Miss I. C. Verdoorn in Bothalia **6,** 411–412 (1954). The true identity of *A. horrida*, however, remained unknown. There is no specimen named *Mimosa horrida* in the Linnaean Herbarium. *M. horrida* is in fact based solely on the figure published by Plukenet in his Phytographia, t. 121, fig. 4 (1692). The descriptive phrase quoted by Linnaeus, "*Acacia maderaspatana* . .", appears at the foot of the plate, and is repeated, without additional information, in Plukenet's Almagestum Botanicum, 3 (1696). Linnaeus certainly never saw the actual specimen drawn; but although he gives a diagnostic phrase, there is nothing in it that could not have been obtained from a study of Plukenet's figure. Fortunately, the specimens drawn for Plukenet's Phytographia are preserved in the Sloane Herbarium at the British Museum (Natural History) and there is one clearly and without doubt corresponding to Plukenet's figure cited by Linnaeus under *Mimosa horrida*. This we have examined, and it must be considered to be the basis of *Acacia horrida*. It is in Herb. Sloane, Vol. 95, fol. 3.

Unfortunately, this specimen consists of no more than the end part of a branchlet, a few inches long, bearing spines and leaves but lacking both flowers and fruits. This unpromising specimen is, however, identifiable.

There are two sources of evidence in doing this, firstly the origin of the specimen, and secondly its morphology.

Plukenet gave the geographical epithet "Maderaspatana", i.e. coming from or appertaining to Madras, whence Plukenet is known to have received specimens; and Madras in Plukenet's time meant much the same geographical area as it does today. In the absence of any evidence against it, Plukenet's epithet "Maderaspatana" must be taken as true, and the type of *Acacia horrida* must have come from Madras. It is true that ships to and from India in those days would call at the Cape of Good Hope, and that plants allegedly Indian sometimes for this reason prove to be South African. However, according to Verdoorn in Bothalia **6,** 411–412 (1954), only one species of *Acacia*, *A. karroo* Hayne, comes to within about 75 miles of Cape Town, and that is the only one in the region. *A. karroo* Hayne and *A. horrida* (L.) Willd. are certainly not conspecific.

The specimen of *A. horrida* in Plukenet's herbarium has paired straight stipular spines and leaves with only 2–3 pairs of pinnae bearing very small linear-oblong leaflets. Now the only two species corresponding in these points that are given in Gamble's Fl. Madras or which are represented among the Madras material in the British Museum and Kew herbaria are *A. eburnea* (L. f.) Willd. and *A. latronum* (L. f.) Willd. The former has capitate, the latter spicate flowers, and there are important vegetative differences between them, given by one of us (J.P.M.B.) in Kew Bull. **1956,** 189 (1956). Plukenet's specimen corresponds well with *A. latronum* and disagrees with *A. eburnea*. Indeed it disagrees with all other Indian acacias.

Unfortunately *A. horrida* antedates and must replace *A. latronum*, and a subspecies made by one of us (J.P.M.B) under *A. latronum* must be transferred to *A. horrida*.

Acacia horrida (*L.*) *Willd.*, Sp. Pl. **4,** 1082 (1806), *non sens. auct. mult.*

Mimosa horrida L., Sp. Pl. 521 (1753).

M. latronum L. f., Suppl. Pl. 438 (1781).

Acacia latronum (L. f.) Willd., Sp. Pl. **4,** 1077 (1806).

subsp. **benadirensis** (*Chiov.*) *Hillcoat et Brenan*, comb. nov.

Acacia bussei Harms ex Sjöstedt var. *benadirensis* Chiov. in Miss. Stefanini-Paoli, Bot., 72 (1916).

A. latronum (L. f.) Willd. subsp. *benadirensis* (Chiov.) Brenan in Kew Bull. **1956,** 191 (1956).

Further discussion of the synonymy, which is not repeated above in full, will be found in Kew Bull. **1956,** 188–191 (1956).

We are grateful to Messrs. J. E. Dandy and J. R. Sealy for their help over this paper.

Spergularia salina and Spergularia marginata and their Heteromorphic Seeds

E. J. Salisbury

The presence of two types of seed within the same capsule has long been known as a feature characterising *Spergularia salina* although Moss in the *Cambridge British Flora* **3,** 21 (1920) incorrectly stated that the seeds were unwinged and attributed the presence of " winged " and " unwinged " within the same capsules of some plants, to hybridism between *S. salina* and *S. marginata*. There has in fact been a great deal of misrepresentation with respect to *S. salina* and the best account of this and other British species is still that given by Grenier and Godron in their *Flore de France* published more than a century ago. These authors not only appreciated that the so-called winged seeds, i.e. those with a white translucent border, occurred in the fruits of *S. salina* but that such were present towards the base of the capsule. Moreover they also recognised that *Spergularia marginata* could likewise produce two types of seed. The descriptions of these species in recent floras are in some respects misleading so that it may be well to state the characters that have been relied upon for diagnosis of the material used in the present account.

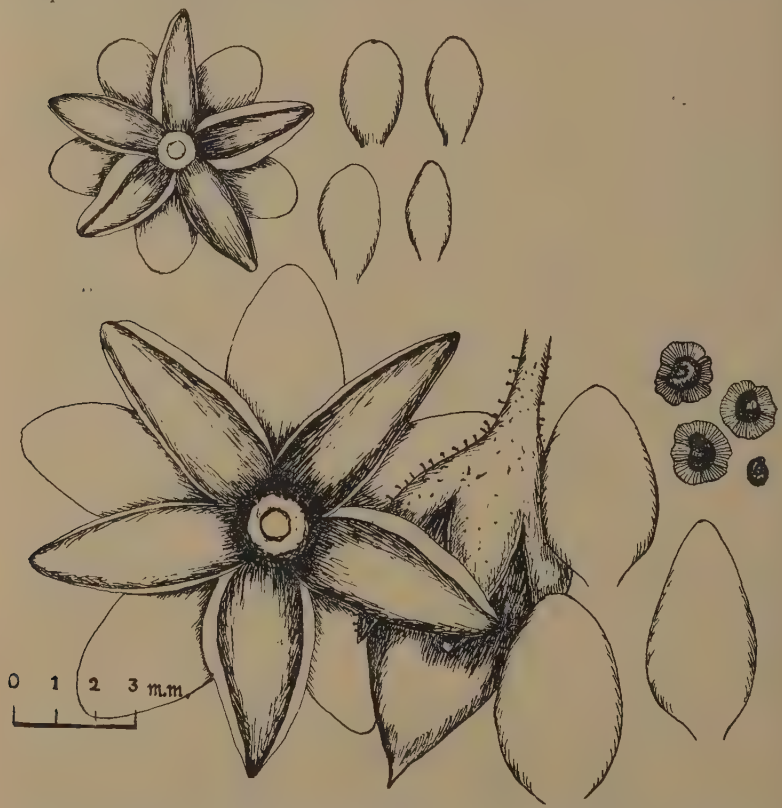
With regard to vegetative characters both species vary considerably as to the degree of development of glandular hairs although *S. marginata* is frequently almost glabrous in the lower part of the plant even if extremely hairy and glandular above. Any differences of this kind appear to be relatively unimportant. So too the leaves are often flattened above in *S. marginata*, but leaves that are elliptical in cross section can be found on plants of both species. The sepals in the calyx of *S. salina* and *S. marginata* are of two types. The two outer sepals have a narrow scarious border whilst the remaining three have a broad translucent margin on both sides of the innermost sepals and broad on one side and narrow on the other of the sepal which is partly in the outer and partly in the inner position. The following descriptions embody some of the data subsequently considered.

Spergularia salina J. S. & C. B. Presl (= *S. marina*)

Flowers 6 to 8 mm. diameter (average 7·3 mm.). Corolla 4 to 6 mm. (average 5·5 mm.). The petals are not longer but usually shorter than the sepals. Normally deep pink towards the apex and white towards the base, the transition is relatively abrupt, giving the flower the appearance of having a " white eye ". Petals oval or tapering. Stamens 2 to 10, most frequently 5 to 7. Capsule 4 to 6 mm. in length globose below with conical apex. Seeds normally heteromorphic in some capsules, mostly unbordered but frequently a few at the base of the capsule possessing a translucent white membranous border. Seeds either tuberculate or smooth. These features have been found to apply to plants growing far removed from other members of the genus.

Spergularia marginata Kittel (= *S. media*)

Flowers 7·5 to 12 mm. in diameter (average about 10 mm.). The petals are usually as long as or slightly longer than the sepals. Usually pale pink towards the apex and white towards the base, the transition being gradual and never abrupt so that the " white eye " effect is absent. More rarely the flowers are concolorous or white. Petals either tapering or oval. Stamens varying in number from 7 to 11, most commonly 10. Capsule 6 to 12 mm. usually about 8 mm. in length, oval below with a sharply tapering conical apex. Seeds often all homomorphic with a translucent white border, the body either tuberculate or smooth, but not infrequently some capsules contain a few seeds near the apex of the capsule which are smaller and have no translucent border.



Above. Flower of *S. salina* seen from below and variations in petal shape. *Below.* Flower of *S. marginata* seen from below ; capsule ; variations in petal shape and the two types of seed.

A large number of specimens of *Spergularia salina* in diverse localities round the English coasts have been examined in the living state and it is certainly not true, as implied in the " Flora of the British Isles ", that this species is always annual. Some individuals that I examined were at least

two years old, possibly even older, though what proportion is perennial I am unable to state. Coste's description of *S. dillenii*, under which he placed *S. salina*, that it is annual, biennial or perennial, may well be true of *S. salina sensu stricto*. Moss described *S. salina* as a perennial which is probably just as misleading as the assertion that this species is an annual. A large number of plants, perhaps the majority, behave technically as biennials with a life span from September of one year to November of the year following. A wide variation in life span may in fact well account for the very wide range in fruit production. This may be less than a score of capsules in a season to approaching nine hundred, representing a seed output of from 1,400 to over 72,000 ! !

Since one of the important diagnostic characters between the two species is the number of stamens a random selection of flowers from numerous plants and various localities were examined with respect to the androecium and the results are set forth in Table I.

TABLE I. *Spergularia salina.*

Variation in the number of stamens of 360 flowers.

Number of stamens	2	3	4	5	6	7	8	9	10
Number of specimens	(6)	(28)	(56)	(84)	(74)	(72)	(33)	(6)	(1)

Average 50·6 ± ·09 (σ 2·5 : S.E.M. 0·13)

The mean for mid-season flowers was 5·92 ± 0·09 and for end-of-season flowers 4·9 ± 0·1. It will be apparent that though the mean for the whole flowering season is approximately six stamens and the mode five, flowers with six and seven stamens are almost as frequent and the occurrence of ten stamens, though rare, is noteworthy.

The above figures only take account of fertile stamens in which the anthers are fully developed but actually no less than ninety-one of the 360 flowers examined, exhibited from one to four staminodes with usually a more or less fully developed filament but no anther. These specimens were as follows :—one flower with no fertile stamen but 1 staminode : one flower with two stamens and 1 staminode : thirteen flowers with three stamens, ten of which had 1 staminode, two had 2 staminodes and the other had 4 staminodes. Of thirteen flowers with four stamens nine had 1, three had 2 and one had 3 staminodes. Of twenty-two flowers with five stamens fifteen had 1 staminode, six had 2 staminodes and one had 3 staminodes. Seventeen flowers with six stamens had 1 staminode in nine examples and 2 staminodes in eight. Of seventeen flowers with seven stamens twelve had 1 staminode and five had 2. Three flowers with eight stamens all had a single staminode and so also three flowers with nine stamens. If we ignore the distinction between fertile and infertile stamens then the frequency distribution is as in Table II.

A similar examination of 279 flowers of *Spergularia marginata* showed six as well as the usual five petals and that whilst ten stamens is the commonest condition this is by no means constant, as appears to be

implied in Clapham, Tutin and Warburg's Flora. In fact, it will be seen from the data cited below that the stamen number ranged from 7 to 11 stamens.

If these examples are representative of the species as a whole then some 31% of the flowers of *Spergularia salina* may exhibit the same number of stamens as some 20% of the flowers of *S. marginata* although in fact the modes are quite distinct. Nevertheless it is clear from the above data that there are both absolute and relative criteria for distinguishing the two species and these have been employed for the identification of specimens used for the subsequent account of their heteromorphic seeds.

TABLE II. *Spergularia salina.*

Variation in number of members of androecium, stamens and staminodes taken together.

Number of stamens and staminodes	1	2	3	4	5	6	7	8	9	10	
Number of examples	(1)	(6)	(16)	(53)	(73)	(77)	(71)	(49)	(10)	(4)	Total 360

Average 5·88 ± 0·05 [σ 1·64 : S.E.M. 0·086]

TABLE IIa. *Spergularia marginata.*

Variation in the number of stamens in 279 flowers.

Number of stamen	7	8	9	10	11		
Number of flowers	(2)	(7)	(48)	(220)	(1)	(278)	Plus one flower with 9 stamens and 1 staminode.

6·7 ± 0·1 [σ 2·69 : S.E.M. 0·16]

The contents of one hundred and eighty-five capsules of *Spergularia salina* from various plants and widely separated localities were examined with the object of determining the occurrence of heteromorphic seeds (See Table III). Quite commonly the capsules contain a small proportion of seeds with a membranous border very similar to those which predominate in the capsules of *Spergularia marginata*. In these 185 capsules the proportion that contained such bordered seeds was 54% and the average number of such seeds in the capsules containing them was 4·4, but if we take into account the entire seed production it would appear that the bordered type represents about 2·9% of the total seed output of the plant. It must however be emphasised that the foregoing data were obtained from plants near the beginning and middle of the fruiting season.

Subsequently material was collected, late in the fruiting season, on which it was possible to obtain undehisced capsules that could be grouped into four categories according to the order of their development upon the plants. In the oldest category, representing the earliest formed capsules there were nineteen examples all of which contained some bordered seeds.

TABLE III.

SEED CONTENTS of 185 Capsules of *Spergularia salina* (each Fig. from 0 to 27 represents a single capsule).

Number of capsules	Total number of seeds in each	Number of bordered seeds in each individual capsule	Number of capsules	Total number of seeds in capsule	Number of bordered seeds in each capsule
1	17	1	5	78	0, 0, 0, 1, 6
1	27	3	3	80	0, 0, 4
1	31	1	3	81	0, 1, 2
1	37	0	4	82	0, 0, 2, 3
1	41	0	7	83	0, 0, 0, 1, 3, 12, 13
1	42	2	2	84	4, 5
1	43	0	5	85	0, 0, 1, 2, 5
1	44	0	7	86	0, 0, 0, 0, 1, 1, 3
1	45	0, 0	2	87	2, 4
2	48	0, 7	5	88	0, 0, 4, 7, 13
1	50	5	6	89	0, 3, 3, 8, 10, 27
1	51	5	5	90	0, 0, 1, 1, 7
2	55	10, 22	3	91	1, 2, 2
1	56	0	5	92	0, 1, 7, 8, 9
1	57	0	4	93	0, 1, 2, 9
2	59	0, 8	5	94	0, 1, 3, 6, 6
5	62	0, 0, 0, 0, 5	7	95	0, 0, 0, 1, 2, 6, 8
2	63	0, 0	4	96	0, 2, 3, 8
3	65	0, 0, 0	1	97	1
3	66	0, 0, 0	5	98	0, 0, 0, 1, 1
2	67	0, 2	6	99	0, 0, 0, 3, 6, 9
2	68	0, 2	4	102	0, 0, 2, 5
2	69	0, 0	6	105	1, 2, 3, 4, 4, 6
4	70	0, 0, 0, 7	1	106	0
3	71	0, 0, 4	2	107	0, 2
4	72	0, 0, 0, 4	1	108	1
6	73	0, 0, 0, 0, 0, 2	3	109	0, 4, 6
1	74	0	3	110	1, 5, 5
5	75	0, 1, 1, 2, 3	1	111	0
2	76	0, 0	1	114	3
3	77	0, 1, 8	2	115	2, 2

A total of 15,218 seeds of which 438 possessed membranous borders and present in 100 of the capsules. Average number of seeds in capsule 82·2. Average number of bordered seeds in the capsules where such were present 4·38).

In the next younger category there were also nineteen capsules and of these all but one contained bordered seeds. In the next younger group, comprising sixteen capsules, nine only had any bordered seeds whilst in the youngest group of all, consisting of fifteen fruits there were again nine capsules containing bordered seeds. It is evident then that upon these same individual plants the proportion of capsules containing bordered seeds declined from between 90% and 100%, at the period represented by the earlier two categories, to about 60%, in that which is represented by the two later. If we group approximately equal numbers of examples into four categories of increasing numbers of contained seeds then we find that, with from 17 to 72 contained seeds, the proportion of capsules with heteromorphic contents is about 28%, from 73 to 85 seeds it is 51%, from 86 to 94 seeds it is 67% and from 95 to 115 seeds it is 72%. This would indicate that the higher the number of contained seeds the more likely there are to be bordered seeds present. As the bordered seeds are produced at the base of the capsules and are thus the first formed they are

unlikely to be materially affected by competition for food supply by the other seeds maturing later and the higher total numbers of seeds may perhaps be taken as indicative of better nutritional conditions when the capsule was formed. Towards the end of the fruiting season, in mid September, the seeds were examined and counted in forty capsules of *Spergularia salina* taken from a number of different plants and only one of these exhibited heteromorphic seeds, namely two with membranous borders and seventy two seeds without borders. The numerical contents of the other capsules was as follows :—22, 35, 37 (two examples), 51, 52, 53, 54, 55, 56 (two), 57, 60, 61 (four), 62 (two), 67 (three), 68, 70 (three), 71 (two), 72 (two), 73 (two), 76 (two), 80 (two), 81 (two), and 85. Finally the contents of a further sixty-two capsules were examined although the number of seeds were only counted in those in which the contents were heteromorphic. Of this total, fifty contained seeds that were apparently homomorphic, except with regard to the normal range of size-variation exhibited by the unbordered seeds. In one capsule, however, which contained sixty-four unbordered seeds, one of these was appreciably larger than the others and from its appearance may well have been, physiologically, a " bordered seed " although the border had failed to develop. If however this capsule be placed in the heteromorphic category and we take into account the forty other capsules produced late in the season that yielded one with heteromorphic seeds, then less than 13% of these one hundred and two late fruits contained bordered seeds as compared with 54% in the earlier part of the fruiting period. The data for the late capsules containing bordered seeds is given in Table IV.

TABLE IV

Total seeds	Bordered seeds
13	7
34	3
50	3
56	2
58	1
58	2
59	1

Total seeds	Bordered seeds
62	? 1
64	1
66	1
67	3
71	1
71	6

The average of 2·5 bordered seeds in those capsules containing both types is to be compared with 4·3% earlier in the fruiting season.

It has been asserted that some plants of *Spergularia salina* produce no bordered seeds and I have myself failed to find any such seeds in a considerable number of capsules examined from one plant *late in the summer*. The possibility must not be overlooked in the light of the evidence just provided that this and other similar plants, if they had been examined towards the beginning of the fruiting season, might have been found to have produced some capsules containing bordered seeds. One can only record that, so far, I have failed to find any plant *at the beginning of the*

fruiting season that did not yield a few capsules with heteromorphic seeds although but a single bordered seed might be present in each. All the facts would appear to suggest that the occurrence of capsules containing heteromorphic seeds has the highest frequency early in the season and declines as this advances and moreover the number of bordered seeds in any one capsule tends to decline also. This would appear to apply not only to the population but to the individual as well, quite apart from any problematical genetical difference in this respect. If, however, as may well obtain, there are strains more, or less, prone to produce both seed types it is quite likely that an interaction of nature and nurture is always involved. The fact that it is at the beginning of the fruit production that heteromorphic capsules are most likely to occur and that the bordered seeds are those first formed suggests that their production is associated with the metabolic vigour of the plant, a concept that has more significance when the heteromorphic seed production of *Spergularia salina* is considered in relation to that of *Spergularia marginata*.

Measurements of the preponderant unbordered seeds of *Spergularia salina* showed a range in maximum length of from 0·6 mm. to 0·85 mm. with an average of 0·74 mm. Corresponding measurements of the body of the bordered seeds exhibited a range of 0·7 to 1·0 mm. with an average of 0·9 mm. The transparent border ranged in width from 0·14 to 0·35 mm. and its margin was sometimes almost smooth but more frequently irregularly undulate. From a sample of 946 seeds the average weight was 0·000089 gm.

An insufficient number of the bordered seeds was obtained to ensure a reliable comparison of their germinative behaviour but it is clear that both types can exhibit intermittent germination and that the larger-bodied seeds, that is to say the bordered ones, germinate more rapidly. Thus, in one sample of 100 bordered seeds and 200 unbordered seeds from the same capsules, the former exhibited 65% germination within two months and the unbordered only 45%. After three months the percentages were 72 and 69. Other tests tended to confirm the impression that the total percentage germination was similar for both kinds of seed but that as in the heteromorphic seeds of *Atriplex hortensis* (c.f. Salisbury, E. J. Science Progress " The Contemplative Gardener " p. 15 Jan. 1952) there is much more rapid germination of the larger-bodied type. It is not improbable that the greater intermittency of the bordered seeds may have survival significance since the seedlings of *S. salina*, like the adult plants and unlike their congener *S. marginata*, are rather intolerant of tidal inundation and if this were to occur the effect upon the seedlings from the bordered seeds might well be catastrophic whereas the delayed germination of a proportion of the unbordered seeds could ensure the species survival. In natural conditions a high percentage of the seeds germinate by the middle or end of September.

A total of one hundred and seventeen capsules of *Spergularia marginata* were carefully examined and the seed content counted. The majority of the seeds, which numbered nearly thirteen thousand (12,997) had a membranous border as one is led to expect from the description in most Floras, but in fact there were no less than one hundred and forty-two seeds

entirely devoid of any membranous border. The frequency of these unbordered seeds with respect to the numbers present in any one capsule was as follows :—One unbordered seed occurred in fifteen capsules, two such seeds in nine capsules, three in two capsules, four in five capsules, five in two capsules, seven, nine and eleven in a single capsule each, thirteen in two capsules and twenty in one capsule. The frequency of capsules containing unbordered seeds was 32·9%.

In the accompanying Table the numbers of seeds in all the 117 capsules is presented and it will be apparent that there is no obvious correlation between total number of seeds and the incidence of seeds having no membranous border. Nevertheless if we group the data in categories of the total number of seeds it is apparent that the non-margined seeds tend to be most frequent in capsules obtaining an approach to the mode in the total number of seeds they contained and that non-bordered seeds are less frequent in capsules which contained either a small or very large total.

TABLE V.

Seed contents of 117 capsules of *Spergularia marginata*.

Number of capsules	Total number of seeds in each capsule	Number of seeds without membranous border	Number of capsules	Total number of seeds in each capsule	Number of seeds without border
1	24	0	1	111	4
1	29	1	2	113	4, 13
1	32	0	1	114	0
1	42	0	1	115	7
1	47	0	1	116	9
1	54	1	1	117	0
1	55	0	3	118	0, 0, 1
1	56	2	2	120	0, 1
1	60	0	1	121	0
1	61	0	1	122	0
1	66	0	1	123	9
1	71	0	3	126	0, 0, 1
1	73	0	3	127	0, 4, 13
1	75	0	1	128	0
1	76	1	4	130	0, 0, 0, 0
1	77	0	4	131	0, 0, 1, 2
2	80	0, 1	2	132	0, 2
1	81	20	2	134	0, 1
2	83	0, 0	1	135	0
2	85	0, 0	1	136	5
1	86	2	3	137	0, 1, 2
3	87	0, 0, 2	2	138	0, 2
1	90	0	1	139	0
2	91	0, 0	1	141	2
1	92	0	2	143	0, 0
3	95	0, 1, 11	1	144	0
2	97	0, 1	1	146	0
1	98	0	2	150	0, 3
1	99	0	1	151	0
2	100	1, 2	3	152	0, 0, 0
2	101	0, 0	1	154	0
3	102	0, 1, 3	1	155	0
5	104	0, 0, 0, 0, 1	2	160	0, 0
1	105	4	1	161	0
2	106	0, 0	1	162	0
1	107	0	1	178	5
1	108	0	1	195	0

Measurements of the two types of seed of *S. marginata* show a similar size relation to that presented by *S. salina*. The body of the unbordered seeds ranged from a diameter of 0·6 mm. to 0·85 mm., on the longer axis, and 0·4 to 0·57 mm., on the shorter, with an average for the former of 0·57 mm. The body of the bordered seeds ranged from 0·7 mm. to 1·1 mm. and 0·6 to 0·8 mm. with an average for the longer axis of 0·9 mm. The membranous margin was normally between 0·2 and 0·4 mm. in width exhibiting an almost smooth or more frequently irregularly undulate margin and radially striated. The surface of the body in both types bore scattered tuberculations which were either obscure or pronounced and this is true of the seeds of *S. salina* also. In both species the tuberculations tend to be more obvious on the unbordered seeds.

TABLE VI.

Table of frequency of non-bordered seeds in relation to grouped totals.

Total number of seeds in capsule	Frequency of capsules containing one or more unbordered seeds		% unbordered of total seed content
24 to 50 seeds	One capsule out of 5	20%	0·5%
51 to 75	Two capsules out of 9	22%	0·5%
75 to 100	Ten capsules out of 27	37%	3·1%
100 to 125	Twelve capsules out of 33	36·3%	2·5%
126 to 150	Thirteen capsules out of 34	38·2%	1·7%
151 to 195	One capsule out of 12	8%	0·3%

In addition to the material already considered, fruiting specimens of *Spergularia marginata* from other parts of the coast were obtained late in the fruiting season and examined for heteromorphic seeds. The actual numbers of seeds were, however, only counted in the capsules which contained unbordered seeds accompanying the bordered ones. These unbordered seeds are usually at or near the apex of the capsule so that, when the three segments into which the wall of the ripe capsule splits, from above downwards, they are commonly the first to be shed and liable to be lost in fully mature capsules. Also the unbordered seeds are very liable to be overlooked because of their inconspicuity as compared with the bordered seeds and the relatively small number present.

These late season fruits were seventy-nine in number and comprised fifty-one in which all the properly developed seeds were provided with a translucent white border although occasionally some seeds were present in which the border was narrow and only formed over part of the periphery of the seed. In a few of these capsules undeveloped borderless seeds were present but since these might have been an arrested stage in the development of a bordered seed they were ignored. In the remaining twenty-eight capsules there were present unbordered seeds, on which no trace of the translucent border was developed, ranging in number from 1 to 15. The data for these fruits are furnished in Table VII.

It will be noted that the proportion of these seventy-nine capsules that contained unbordered seeds was 35·4% compared with 32·9% in the capsules examined in the middle of the fruiting season. Although this difference of 2·5% is small the same trend to greater heteromorphy towards the end of the fruiting season is shown by the percentage of

unbordered in the capsules containing both types. This was 3% in the summer capsules and 4·5% in the Autumn capsules.

Nearly a thousand seeds of *Spergularia marginata* were weighed from each of two localities and the average for the one was 0·000127 gm. and for the other 0·00024 gm. Germination was somewhat intermittent and yielded approximately 70% but far too few ripe unbordered seeds were available for significant tests of these. The possession by the great majority of the seeds of the membranous border naturally suggests dispersal by wind but it is in fact probable that most of them are distributed over the salt marshes by the tide. The statement that the seeds do not float is only partially true and rather misleading. When shed onto the surface of sea water they do in fact float but if pushed beneath the surface-film slowly sink. As the capsules dehisce only when the air around them is dry the seeds are probably blown onto the surface of the slowly rising tide and spread around the marshes, sinking beneath the surface onto the mud during slack water before the receding tide would have carried them out to sea.

TABLE VII.

Contents of twenty-eight late-formed capsules of *Spergularia marginata*, containing both types of seed.

Total number of seeds in capsule	Number of unbordered seeds	Total number of seeds in capsule	Number of unbordered seeds
11	4	98	1
38	1	99	2
53	2	100	1
63	4	101	2
70	8	103	1
75	1	104	2
77	4, 15	105	14
83	1	106	2
86	3	109	7
88	1	110	1
89	1, 9	117	7
90	4	121	5
95	2	140	1

Average number of bordered seeds **79·4**. Average number of unbordered seeds **3·82**. Percentage of unbordered seeds 4·5.

The comparison of *Spergularia salina* with *Spergularia marginata* is of particular interest since in both species heteromorphic seeds occur, though in markedly different proportions. In various floras the seeds of *S. marginata* are stated to be all broadly winged and this is used as a diagnostic character but, as we have seen, although this may be true for a majority of the capsules at the beginning of the season some of the capsules produced later in the season usually contain unbordered seeds. Just as *S. salina* may form one or several membranously-bordered seeds towards the base of the capsule followed by numerous unbordered ones, so too *S. marginata* produces numerous bordered seeds from the base of the capsule upwards that may be followed by one or several unbordered ones. Thus the sequence is the same in both but the proportions different. Moreover the comparison goes further since it is at the beginning of the fruiting season that one is most likely to find bordered seeds in the capsules

of *S. salina*, so too it is towards the end of the fruiting season that unbordered seeds are most likely to be found in the capsules of *S. marginata*.

Although the comparative rarity of the unbordered seeds of *S. marginata* has precluded entirely reliable germination tests it would appear that the physiological relationship between the two types is similar in both. In one feature of morphology, however, there is some divergence. Since, whereas in *Spergularia salina* the distinction between the two types is, normally, sharply drawn (for the sole exception encountered is the large unbordered seed already described), in *Spergularia marginata* intermediates are sometimes encountered in which there is a partially developed wing upon a seed body approaching more nearly to that of the unbordered type of seed.

Moss, in mistakenly assuming the heteromorphic condition of the seeds of *S. salina* to be an indication of hybridity with *S. marginata*, was clearly quite ignorant of the fact that the same feature is exhibited in a lesser degree by *S. marginata*. Since *Spergularia salina* is normally self-pollinated and has 36 chromosomes as compared with 18 in *S. marginata* the occurrence of fertile hybrids between them is problematical and in fact the heteromorphic character is manifested by both species when growing in isolation. Further although *S. salina* is not, as already emphasised, invariably annual it is not a long-lived perennial so those localities where it has been in isolation for some years should display a population exhibiting some evidence of segregation whereas, in fact, they are very uniform in character. Evidently heteromorphic seeds are a feature of both species in varying degrees. The much more prolonged production of bordered seeds by *S. marginata* than by *S. salina* before unbordered seeds are formed suggests a greater and more prolonged metabolic vigour, manifest also in the larger flowers and fruits and in the high mode for staminal number, despite the fact that this species possesses only half the number of chromosomes present in *S. salina*.

Whilst it is conceivable that heteromorphic seeds have a survival value for *S. salina* it is difficult to believe that the vestigial heteromorphism of *S. marginata* can have such significance and perhaps we see here a feature in process of elimination.

Notes from the East African Herbarium: V

A Correction

By what can only be described as a mental aberration I made a new combination for *Gardenia manganjae* Hiern in a genus, *Dasycodon*, which has not been validly published [Kew Bull. **1957:** 353, line 26 (1957)]. It is possible that the group it refers to is not distinct from *Rothmannia* Thunb. but I am not publishing another new combination. The synonymy I gave is I believe correct but the new combination must be deleted.

B. Verdcourt.

Nomenclatural Notes: IV*

A. A. Bullock and S. G. Harrison

The correct name for the Clove

More than ten years ago plant names for use in the British Pharmacopoeia and Pharmaceutical Codex were checked for nomenclatural accuracy by Dr. T. A. Sprague. He found that the name in current use for the clove, *Eugenia aromatica* (Linn.) Baillon, is illegitimate and he prepared a memorandum on the subject which, however, was never published. Unfortunately the correct name, invalidly published, has appeared in pharmaceutical literature.

Sprague listed the following synonyms, in chronological order :—

(1) *Caryophyllus aromaticus* Linn. (1753).

(2) *Eugenia caryophyllata* Thunb. (1788).

(3) *Myrtus caryophyllus* Sprengel (1825),—non *Myrtus aromaticus* Salisbury (1796).

(4) *Eugenia aromatica* (Linn.) Baillon (1877),—non O. C. Berg (1854).

(5) *Jambosa caryophyllus* (Sprengel) Niedenzu (1893),—non *Jambosa aromatica* Miquel (1855).

(6) *Syzygium aromaticum* (Linn.) Merrill et Perry (1939).

The name *Eugenia aromatica* cannot now be used for the clove since Baillon's combination is a later homonym of *E. aromatica* O. C. Berg, which is a different species. The next earliest epithet, *caryophyllata*, is illegitimate since *aromatica* was available to Thunberg when he made the transfer in 1788. Sprengel correctly provided a new epithet, *caryophyllus*, when he transferred the species to *Myrtus* in 1825, since Salisbury had used the name *Myrtus aromoticus* in 1796 for a different species. Niedenzu, also correctly, made use of Sprengel's epithet in 1893 when he transferred the clove to the genus *Jambosa* DC. (nom. cons.), since *J. aromatica* had been used by Miquel in 1855 for a different species.

There are thus three legitimate names for the clove ; the correct one depends upon the classification adopted. They are :—

(1) under *Syzygium* Gaertner (1788. nom cons. prop. ; vide Merrill et Perry in Mem. Amer. Acad. 18 : 136. 1939 ; McVaugh in Taxon 5 : 164, 165. 1956), it will be *S. aromaticum* (Linn.) Merrill et Perry, *l.c.* 196.

(2) under *Jambosa* DC. (1828 ; nom. cons.), it will be *J. caryophyllus* (Sprengel) Niedenzu in Engler et Prantl. Naturl. Pflanzenfam. 3 (7) : 84. 1893.

(3) under *Eugenia* Linn. (1753), and this is where we place the species, it is **Eugenia caryophyllus** (*Sprengel*) *Bullock et Harrison*, comb. nov. (syn. *Myrtus caryophyllus* Sprengel Syst. **2** : 485 . 1825).

---

*Continued from Kew Bull. 1957: 409. 1958.

A New Species of Oedogonium from South India

N. A. Erady and K. Rajappan

The alga forming the subject of this paper was found growing along with species of *Utricularia* in very shallow water in paddy fields at Mayyanad, Kerala State, South India, in December 1955. The alga seems to be new and a description of it based on a study of living specimens is given below.

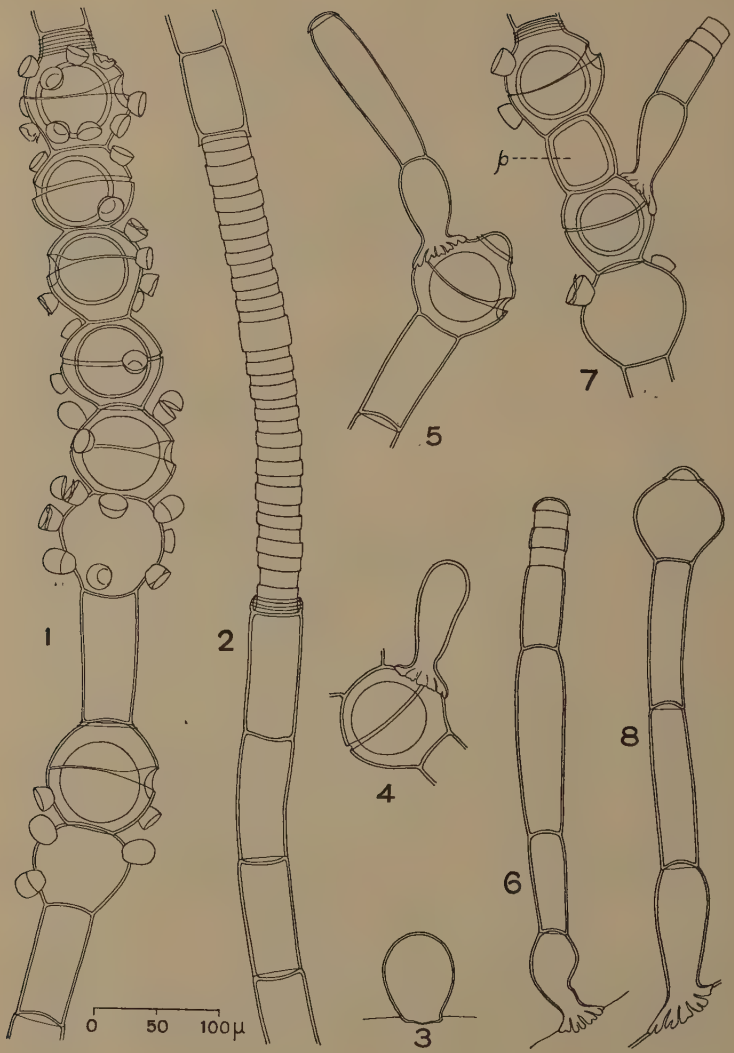
Description

Plants attached during early stages of growth, later free floating ; holdfast cell elongate obovate, richly lobed ; vegetative cell without marked polarity ; distal cell with broadly rounded apex ; zoospore globose or imperfectly ovoid.

Plants dioecious, nannandrous, idioandrosporous ; oogonium 1–9 seriate, terminal or intercalary, depressed globose or depressed pyriform-globose, operculate, division median, wide ; oospore globose or rarely subdepressed-globose, filling the oogonium to a fair extent, but not fully ; spore wall smooth ; suffultory cell of the same form as other vegetative cells ; androsporangium two to many seriate ; androspore ovoid ; mature dwarf male almost of the same form as androspore, obovoid, two celled, on oogonium or occasionally on suffultory cells or other vegetative cells ; antheridium internal, antheridial cells 2, lower cell smaller, sterile stipe cell absent ; antherozoid one from each cell, spherical or sub-ovoid ; holdfast (30) 34–40 (44) μ wide, (82) 96–108 (120) μ long ; vegetative cell (28) 40–48 (52) μ wide, (64) 110–130 (152) μ long ; suffultory cell (32) 40–46 (50) μ wide, (88) 100–120 (132) μ long ; oogonium (72) 80–88 (96) μ wide, (60) 64—74 (80) μ long ; oospore (52) 60–64 (72) μ wide, (52) 60–64 (72) μ long ; androsporangium (24) 28–34 (40) μ wide, (8) 10–14 (20) μ long ; androspore 18–22 μ wide, 22–28 μ long ; dwarf male 81–22 μ wide, 22–28 μ long ; antheridium upper cell 18–22 μ wide, 14–16 μ long, lower cell 16-20 μ wide, 8-12 μ long ; antherozoid 11–18 μ wide, 12–18 μ long.

Parthenospores which are somewhat similar to those described by Mainx (Mainx, 1931) have been repeatedly observed in this species. They are either sub cylindric or cylindric globose (fig. 7,p). The spore completely fills the oogonium in which it is formed and has a reddish brown colour. It contains plenty of stored up food materials and is provided with a smooth thick wall.

This alga resembles *Oedogonium perspicuum* Hirn (Hirn, 1900; Tiffany, 1930) and *Oe. confertum* Hirn (Hirn, 1900 ; Tiffany, 1930), both found in Queensland, Australia. The former was also described from Koh-Chang, Siam, under the name *Oe. dioicum* Carter (West and West, 1901). The features of similarity include : (1) the operculate nature of the oogonium in which the division is median and wide, (2) the generally globose, smooth walled oospore which is not filling the oogonium, and (3) the general form of the dwarf male. The present alga, however, is



Oedogonium keralense Erady et Rajappan sp. nov.

Fig. 1. Part of female filament showing oogonia and dwarf males in various stages of development. Fig. 2. Part of androsporangial filament showing seriate androsporangia. Fig. 3. An early stage in the germination of the zoospore. Fig. 4. One celled germling attached to an intercalary oogonium. Fig. 5. A two celled germling on a terminal oogonium. Fig. 6. An early stage in the development of androsporangial filament showing premature development of androsporangia. Fig. 7. A "dwarf" androsporangial filament on an oogonium. Also showing a parthenospore (p) between two normal oogonia. Fig. 8. An early stage in the development of female filament showing premature development of oogonium.

sufficiently different from the two species mentioned above to be considered as a separate species. It differs from *Oe. confertum* in the larger size of almost all its parts and in the possession of noncapitellate vegetative cells. In dimensions, the present alga comes nearer to *Oe. perspicuum* than to *Oe. confertum*, and is easily distinguished from them by the general form of the oogonium. In both *Oe. confertum* and *Oe. perspicuum*, the oogonia are compressed and laterally spread, whereas in the authors' alga the oogonia are more globose and only very slightly compressed. Again, the oospore in the authors' alga fills the oogonium to a much greater extent than in the other two species. Further, the authors' alga is definitely idioandrosporous, and dwarf males may also occur on suffultory cells or even on ordinary vegetative cells. The authors, therefore, propose a new species for it, which may be called *Oedogonium keralense*. The diagnostic features of the new species may be given as follows:—

Oedogonium keralense *Erady et Rajappan* sp. nov.

Plantae dioicae, nannandrae, idioandrosporae ; oogonium 1–9 seriatum, terminale vel dispersum, depresse globosum vel pyriformi-globosum, operculatum, divisione media, lata ; oospora globosa vel raro subdepresso-globosa, haud implens oogonium ; sporae parietes leves ; cellula suffultoria eiusdem formae ac alliae cellulae vegetativae ; androsporangium bis ad pluries seriatum ; cellula mascula nana obovoidea, bicellularis, oogonio vel aliquando cellulis suffultoriis insidens ; cellula vegetativa (28) 40–48 (52) μ lata, (64) 110–130 (152) μ longa ; cellulis suffultoriis (32) 40–46 (50) μ latis, (88) 100–120 (132) μ longis ; oogonium (72) 80–88 (96) μ latum, (60) 64–74 (80) μ longum ; oospora (52) 60–64 (72) μ lata, (52) 60–64 (72) μ longa ; androsporangium (24) 28–34 (40) μ latum, (8) 10–14 (20) μ longum ; cellula mascula nana 18–22 μ lata, 22–28 μ longa.

Typus lectus in oryzetis in loco Mayyanad, in Statu Kerala, in India australiori die 25 decembris anni 1955, convivens cum *Utricullariae* specie, a N. A. Erady et K. Rajappan, et positus in Botan. Dept., in collegio Universitatis, Trivandri, in India australiori.

Type material of *Oedogonium keralense* has been deposited in the Herbarium of the Royal Botanic Gardens, Kew.

Summary

A new species of *Oedogonium*, *Oe. keralense* sp. nov. which comes near *Oe. perspicum* Hirn and *Oe. confertum* Hirn, is described. The description is based on a detailed study of living specimens. It is found growing in shallow water in paddy fields at Mayyanad, Kerala State, South India. It is dioecious, nannandrous and idioandrosporous. The oogonium is of the operculate type with median division and smooth walled globose oospore. The mature dwarf male is two celled and from each cell a single spermatozoid is liberated. Attention is also drawn to the occurrence of parthenospores.

In conclusion the authors wish to express their gratitude to Prof. L. H. Tiffany, Northwestern University, Illinois, for helpful suggestions in the identification and study of the new species. Their thanks are also due to Rev. Fr. Dr. H. Santapau for the latin translation of the diagnosis and to

Prof. A. Abraham, University of Travancore, for his kind encouragement and for making available the necessary facilities.

References

1. Hirn, K. E. (1900) ; Monographie und Iconographie der Oedogoniaceen. Acta Soc. Sci. Fennicae, 27 : 272–273.
2. Mainx, F. (1931) ; Physiologische und genetische Untersuchungen an Oedogonien. I. Mitteilung. Zeitschr. Bot. 24 : 481–527. (cited from Smith, 1950).
3. Smith, G. M. (1950) ; Freshwater algae of the United States. New York. 2nd ed. p. 206.
4. Tiffany, L. H. (1930) ; The Oedogoniaceae, a monograph. pub. by the author. p. 141.
5. West, W. and G. S. West (1901) ; Freshwater Chlorophyceae. Flora of Koh-Chang. Bot. Tidskr. 24 : p. 175.

Pharmacognosy.*—In the five years that have elapsed since the publication of the 6th edition of Trease's textbook, new uses for vegetable products and new methods of chemical examination have been developed. The 7th and latest edition contains such new material. The size of the volume is however not increased, instead certain less important items have been condensed or omitted. The maps and glossary of previous editions are excluded although the text still refers the reader to the latter. A new appendix is a table of the biological sources of drugs with some important Pharmacopoeias, etc., where they are described. Notable changes in the book are the increase in the information on the constituents of Phaeophyceae, a more comprehensive treatment of *Ammi visnaga* and *Rauwolfia* in line with the modern interest in the drugs, a new chapter on " Tracer Technology and Pharmacology " giving information on methods and applications, and a section devoted to the newer man-made fibres.

The previous arrangement of the book is retained with about two thirds of the space devoted to the comprehensive treatment of individual plant and animal products, while other chapters deal with the general aspects of history, commerce, cultivation and preparation ; extraction and analysis of active principles ; microscopy, the microscopic structure and identification of drugs.

BARBARA J. YOUNGMAN.

* " A Textbook of Pharmacognosy " by G. E. Trease, 7th Edition, pp. 8 + 808, illus. index. Ballière, Tindall & Cox Ltd., 1957. 42s.

African Orchids: XXV*

V. S. Summerhayes

The present contribution contains in particular a revision of the genus *Platycoryne*, and a study of the species of *Eulophia* allied to *E. orthoplectra* (Rchb. f.) Summerh. In addition to the eleven new species described in these accounts there are descriptions of five new species belonging to other groups or genera. Miscellaneous taxonomic and nomenclatural notes are also included. The type specimens of all the new species are in the Kew Herbarium.

Habenaria (sect. **Chlorinae**) **hologlossa** *Summerh.*, sp. nov. ; affinis *H. chloroticae* Rchb. f., a qua petalis latioribus, labello integro recurvato, calcari breviore facile distinguenda.

Herba terrestris, erecta, glaberrima, 30–80 cm. alta. *Tubera* globosa, 5–10 mm. diametro, tomentosa. *Caulis* simplex, rectus vel leviter flexuosus, per totam longitudinem foliatus, ± teres, basi usque ad 4 mm. diametro. *Folia* 6–9, 2 infima vaginiformia, albido-recticulata, intermedia ± erecta, linearia vel ligulato-linearia, apice acutissima, basi vaginantia, usque ad 16 cm. longa et 12 mm. lata, superiora anguste lanceolata, acuminata, sursum decrescentia in bracteas abeuntia. *Inflorescentia* terminalis, simpliciter racemosa, 7–30 cm. longa, densiuscule multiflora ; rhachis leviter fractiflexa, ± angulata ; bracteae anguste lanceolatae, acuminatae, inferiores ovarium pedicellatum fere aequantes vel interdum superantes. *Flores* arcuatim suberecti vel erecto-patentes, virides ; pedicellus cum ovario arcuatus, 10–12 mm. longus. *Sepalum* intermedium leviter incurvatum, ellipticum vel elliptico-ovatum, apice obtusum, circiter 3·5 mm. longum, 1·75–2·5 mm. latum, leviter convexum ; sepala lateralia deflexa, leviter torta, oblique et curvatim semiovata vel semi-elliptica, apice subacuta, 4·5–5·5 mm. longa, 1·8–2·7 mm. lata ; omnia sepala trinervia. *Petala* erecta, cum sepalo intermedio agglutinata, galeam formantia, oblique vel curvatim ovata vel oblongo-ovata, apice acuta, 3·3–3·9 mm. longa, 1·3–2·3 mm. lata, trinervia. *Labellum* simplex, recurvatum, ligulatum vel lanceolato-ligulatum, ± convexum, circiter 6 mm. longum et 1·6 mm. latum, apice obtusum vel fere truncatum emarginatum, plurinervium ; calcar cylindricum, incurvatum, 10–12 mm. longum, parte distali leviter inflatum. *Anthera* erecta, vix apiculata, circiter 2·75 mm. alta, loculis parallelis, canalibus fere 1·5 mm. longis, auriculis oblongis angustis. *Stigmata* porrecta vel leviter incurvata, clavata vel subfusiformia, circiter 2 mm. longa ; rostelli lobus intermedius antheram aequans, ligulatus, apice truncatus, medio carina humili longitudinali instructus, inferne dilatatus, in toto 1·5–2 mm. longus, lobi laterales oblongi, truncati, intermedio duplo breviores ; ovarium curvatum, leviter 6-sulcatum.

Kenya Colony. Mt. Elgon, S. side, 2010 m. alt., among grass in open bush near water, Aug. 1934–1939, *Tweedie* 201 ; 209 ; 323 ; 324 (type) ; 325 ; 326 ; 469.

Angola. Moxico Distr., by R. Luao, in sandy open ground, Feb. 1938, *Milne-Redhead* 4523.

* Continued from K.B. 1957, 126.

When I first saw this species I thought it might be merely an abnormal form of *H. chlorotica* Rchb. f. which is very similar in general appearance. However on examination of further material I find that the structure is remarkably constant except for a shortening of the spur in some flowers on two plants. The column is quite normally constructed for sect. *Chlorinae* and I see no teratological features in any part of the flower. The most striking feature is the simple labellum which is always recurved, whereas in *H. chlorotica* and in the allied *H. filicornis* Lindl. the three lobes are markedly incurved.

Platycoryne Rchb. f.

The genus *Platycoryne* was proposed by the younger Reichenbach in 1855 (Bonplandia, **3,** 212) for a Madagascan plant collected by Pervillé. He compared it with the genus *Cynorchis* Thou. from which he said it differed in the nature of the stigmata. However, in the description he mentions that in several features it resembles *Habenaria.* Ten years later he appears either to have forgotten his genus or to have reduced it to *Habenaria* since in his account of Welwitsch's Angolan orchids (Flora **48,** 178–179 : 1865) he describes under *Habenaria* several species which are clearly congeneric with the original *Platycoryne pervillei.* In the Genera Plantarum of Bentham and Hooker (**3,** 632 : 1883) the genus is placed quite incorrectly in the subtribe *Diseae,* but Kraenzlin, in his monograph of *Habenaria,* treats *Platycoryne* as a section of that genus (Engl. Bot. Jahrb. **16,** 206–210 : 1893), a view which was followed by subsequent authors during the next few years. However, in 1898 Rolfe, in the Flora of Tropical Africa (**7** : 255–259), resuscitated Reichenbach's genus, considering it to be distinct on account of the marked habit, the cucullate middle-lobe of the rostellum and the short thick stigmatic processes. Schlechter, on the other hand, followed Kraenzlin in treating the genus as a section of *Habenaria,* though he pointed out that the species form a very natural group with a definite geographical distribution and marked ecological preferences (Engl. Bot. Jahrb. **53,** 492–493 : 1915).

In my opinion the group is more conveniently treated as a distinct genus characterised by the distinct habit, the arrangement and character of the floral parts, the large rostellum which, though not cucullate as stated by Rolfe, often overtops the anther and is usually placed well in front of it, the rather short, much thickened and rounded stigmatic processes and the predominantly yellow or orange colour of the flowers which often occur in short dense heads. In my experience the species of *Platycoryne* can be recognised readily at sight from the African species of *Habenaria,* both in the living condition and in the herbarium.

A formal description of the genus is appended. This is followed by a short conspectus and partial key and then an enumeration of the species with notes, etc., about the more interesting ones.

Platycoryne *Rchb. f.* in Bonplandia, **3,** 212 (1855) ; Benth. in Benth. & Hook. f. Gen. Pl. **3,** 632 (1883) ; Rolfe in Fl. Trop. Afr. **7,** 255–259 (1898) ; Summerh. in Hutch. & Dalz. Fl. West Trop. Afr. **2,** 412–413 (1936) ; H. Perrier in Humbert, Fl. Madag. Orch. **1,** 66–67 (1939). *Habenaria* sect. *Platycoryne* Kraenzl. in Engl. Bot. Jahrb. **16,** 206–210

(1893), et Orch. Gen. et Sp. **1,** 447–453 (1897) ; Pfitz. in Engl. & Prantl, Nat. Pflanzenf. Nachtr. 100 (1897) ; Schltr. in Engl. Bot. Jahrb. **53,** 492–494 (1915).

Terrestrial herbs, characteristic of swamps and damp grasslands, the aerial parts usually quite glabrous. *Tubers* 2, ellipsoid or ovoid, shortly stalked, usually more or less tomentose. *Stems* erect, unbranched, rather slender, bearing a tuft of slender flexuous roots at the base, a number of leaves variously arranged along its length and terminating in a usually short dense inflorescence. *Leaves* rather narrow, lanceolate to linear, either in a tuft at the base of the stem with a few smaller ones scattered along the remainder, or more evenly distributed along the whole stem but usually closer together and larger in the lower part. *Inflorescence* usually short and dense, often almost umbel-like, but sometimes elongated with the flowers spread out at longer intervals, from 1-flowered in a few species to as much as 20-flowered in others, but the number normally lying well within these extremes ; bracts rather large and leaf-like in consistency but not equalling the flowers. *Flowers* ascending or suberect with the pedicellate ovary arcuate so as to bring the flowers out from the stem, yellow, orange-yellow, orange or flame-coloured, sometimes with an admixture of green, in one species creamy-white. *Dorsal* sepal erect or incurved, broadly elliptical or ovate, usually markedly convex, adnate to the petals to form a broad and shallow hood around and at the back of the anther ; lateral sepals in most species sharply deflexed and lying ± parallel with the ovary but in a few species spreading, lanceolate, lanceolate-oblong or elliptical-lanceolate ; all sepals with several marked nerves converging at the apex and joined by numerous transverse veins. *Petals* almost always adnate to the dorsal sepal, falcately lanceolate or ligulate or rarely obliquely ovate, usually entire but rarely with a much smaller anterior lobe at the very base, the inner half often fleshier and more opaque, several-veined. *Labellum* calcarate, decurved or incurved in different species, ligulate, narrowly oblong or narrowly elliptical, entire or with a short tooth or narrow linear lobe on each side at the base or more rarely halfway towards the apex, usually convex with the sides recurved, about the same length as or shorter than the other perianth members ; spur dependent, varying in length (up to 6 cm. long in 1 species), narrowly cylindrical but often somewhat dilated at the end. *Anther* erect or incurved, often mucronate, loculi parallel, canals varying in length but usually well developed, adnate to the lateral lobes of the rostellum ; pollinia sectile, each with a long caudicle and elliptical viscidium, which is either held in a cup-like depression at the end of the rostellar arm or rests in a notch just below the apex. *Stigmata* decurved, very thick with broad rounded knob-like apices which are held just over the entrance to the spur ; rostellum distinctly 3-lobed, the middle lobe more or less erect, in front of and often overtopping the anther, narrow and acute or broader and rounded, ± papillose, lateral lobes usually porrect and projecting beyond the hood, rarely quite short and shoulder-like ; ovary with several rounded ribs and narrow sulcae between.

Type species :—*P. pervillei* Rchb. f.

Conspectus of Species

Petals entire :
Labellum entire :
Spur less than 3·5 cm. long :
Rostellum side-lobes shoulder-like, rounded, much shorter than the middle lobe :
1. *P. protearum* (Rchb. f.) Rolfe
2. *P. ukingensis* (Schltr.) Summerh.
3. *P. affinis* Summerh., sp. nov.

Rostellum side-lobes distinct, with narrow truncate apex : Lateral sepals narrow and acute ; labellum linear or ligulate :
4. *P. ambigua* (Kraenzl.) Summerh.
5. *P. pervillei* Rchb. f.
6. *P. buchananiana* (Kraenzl.) Rolfe
7. *P. megalorrhyncha* Summerh.
8. *P. paludosa* (Lindl.) Rolfe

Lateral sepals broad and obtuse ; labellum oblong or obovate :
9. *P. latipetala* Summerh., sp. nov.
10. *P. grandiflora* Summerh., sp. nov.

Spur over 5·5 cm. long :
11. *P. macroceras* Summerh., sp. nov.

Labellum with short, often tooth-like lobes, at base or near middle : Side lobes of labellum arising just below middle ; flowers spread out on stem :
12. *P. trilobata* Summerh., sp. nov.
13. *P. brevirostris* Summerh., sp. nov.

Side lobes of labellum basal, tooth-like ; flowers closely aggregated : Leaves mostly in tuft at base :
14. *P. heterophylla* Summerh., sp. nov.
15. *P. elegantula* (Kraenzl.) Summerh.
16. *P. montis-elgon* (Schltr.) Summerh.
17. *P. ochrantha* (Schltr.) Summerh.
18. *P. crocea* (Schweinf. ex Rchb. f.) Rolfe

Leaves not in tuft at base, but evenly distributed along stem :
19. *P. micrantha* Summerh., sp. nov.
20. *P. mediocris* Summerh., sp. nov.

Petals with small anterior lobe at base :
21. *P. guingangae* (Rchb. f.) Rolfe

Enumeration of Species

1. **Platycoryne protearum** (*Rchb. f.*) *Rolfe* in Dyer, Fl. Trop. Afr. **7,** 258 (1898).

[*Habenaria paludosa* non Lindl. ; Rchb. f. in Flora, **48,** 178 (1865)].

H. protearum Rchb. f. Otia Bot. Hamburg. 57 (1878) ; Kraenzl. Orch. Gen. et Sp. **1,** 437 (1897).

Distrib. : Angola, N. Rhodesia, southern Tanganyika Territory, Nyasaland.

P. protearum belongs to a group of species with rather small greenish-yellow or green and yellow flowers which are always somewhat spaced out to form a comparatively long lax spike. It has a much more extensive distribution than any of the other members of the group all of which are at present known from comparatively limited areas. In this species and in several other allies the side lobes of the rostellum are very short and shoulder-like, the middle lobe being much taller and pointed.

The closest relatives of *P. protearum* are *P. ukingensis* (Schltr.) Summerh. and *P. affinis* Summerh. The former has rather larger flowers and a distinctly longer spur while the labellum is considerably widened at the base, while in the latter the labellum is shorter and broader and widened in the lower part.

2. **Platycoryne ukingensis** (*Schltr.*) *Summerh.*, comb. nov.

Habenaria ukingensis Schltr. in Engl. Bot. Jahrb. **53,** 494 (1915).

Distrib. : southern Tanganyika Territory.

This species is clearly allied to *P. protearum* (Rchb. f.) Rolfe but differs in the slightly larger flowers, the labellum distinctly widened in the basal part and the longer spur. There is also a slight suggestion of the development of lateral lobes at the lower anterior corners of the petals.

3. **Platycoryne affinis** *Summerh.*, sp. nov. ; affinis *P. protearum* (Rchb. f.) Rolfe, a qua floribus minoribus, petalis liberis, labello latiore dimidio basali dilatato obscure lobulato satis differt.

Herba terrestris erecta, gracilis, 15–40 cm. alta, tuberis exceptis glaberrima ; tubera ellipsoidea, 1·5 cm. longa, 7 mm. diametro, breviter velutina. *Caulis* rectus vel leviter flexuosus, teres vel leviter angulatus, basi 1–1·5 mm. diametro, basi radices flexuosas graciles emittens, cataphyllis 1–2 vaginantibus brevibus acutis instructus, superne distanter foliatus, apice 2–4-florus. *Folia* 3–5, erecta vel suberecta, interdum ± erecto-patentia, lineari-lanceolata, acuta vel acuminata, usque ad 5 cm. longa et 5 mm. lata, sursum decrescentia suprema in bracteas abeuntia. *Inflorescentia* sub-laxe 2–4-flora ; rhachis 1·5–4 cm. longa, gracilis, teres ; bracteae elliptico-lanceolatae, acutae, 7–21 mm. longae, quam ovario longe pedicellato multo breviores. *Flores* erecti vel leviter arcuatim suberecti, flavido-virides vel flavidi ; pedicellus cum ovario arcuatus, 2·5–3 cm. longus. *Sepalum* intermedium leviter incurvatum, valde convexum, late ovatum, apice subacutum vel apiculatum, circiter 6 mm. longum, 4–5 mm. latum, 3–5-nervium ; sepala lateralia deflexa, oblique curvatim oblongo-lanceolata, apice acuta, 5–6·5 mm. longa, 2–2·5 mm. lata, tri- vel subquinquenervia. *Petala* erecta, libera (haud sepalo intermedio conglutinata) oblique triangulari- vel oblongo-lanceolata, acuta, 4–5 mm. longa, circiter 2·5 mm. lata, 2–3-nervia. *Labellum* deflexim porrectum, ovatum vel elliptico-ovatum, dimidio inferiore dilatatum obscure trilobulatum lobulis latis rotundatis, apice subacutum, 3·7–4·7 mm. longum, 2–2·7 mm. latum, ± carnosum, leviter convexum, 5-nervium ; calcar dependens, leviter incurvatum, dimidio basali anguste cylindricum, dimidio distali leviter clavato-inflatum apice ipso obtusum, 18–21 mm. longum. *Anthera* leviter incurvata, apiculata, 2·5–3·5 mm. alta, loculis parallelis, canalibus porrectis gracilibus cum

rostello adhaerentibus 2–2·5 mm. longis, auriculis semi-orbicularibus rugulosis ; pollinia ovoidea, sectilia, caudiculis longis gracilibus, viscidiis ellipticis pro rata magnis. *Stigmata* leviter recurvatim porrecta, crasse clavata, obtusissima, 2–3 mm. longa ; rostellum erectum vel incurvatum, antheram valde superans, supra medium trilobatum, in toto 3–4 mm. altum, lobo intermedio lanceolato ± acuto papilloso quam lateralibus multo majore, lobis lateralibus brevibus rotundatis viscidio amoto breviter incisis.

Southern Rhodesia. Salisbury Distr., Beatrice, by stream, Dec. 1922, *Eyles* 3809 ; Ruwa River, in wet vlei, Dec. 1947, *Wild* 2262 (S. Rhod. Gov. Herb. No. 18293) (type) ; Rumani, in vlei, Dec. 1948, *Greatrex* S.R.G.H. No. 22338 (abnormal) ; Cleveland Dam, 1350 m. alt., in vlei, Dec. 1945, *Wild* 554 (S.R.G.H. No. 14194) (partly abnormal) ; Marandellas Distr., S. Marandellas, Dec. 1931, *Myres* 125 ; Matobo Distr., Matopos, near Bylemboiye River, Jan. 1929, *Cheesman* 28a ; Besna Kobila Farm, 1440 m. alt., in grassland, Dec. 1935, *Miller* 3172.

This species, which is known only from Southern Rhodesia, differs from *P. protearum* (Rchb. f.) Rolfe in the smaller flowers and shorter and broader lip which is very obscurely lobed in the lower half. The petals always seem to be quite free from the intermediate sepal, a rather uncommon occurrence in the genus.

4. **Platycoryne ambigua** (*Kraenzl.*) *Summerh.* in Hook. Ic. Pl. **33,** t. 3249 (1934).

Habenaria ambigua Kraenzl. in Engl. Bot. Jahrb. **27,** 175 (1900).

Distrib. : Tanganyika Territory.

A large-flowered species easily recognised by the long pointed perianth segments, the intermediate sepal being incurved and resembling a scimitar in side view. The leaves are long and narrow while the flowers are more spaced out on the rhachis than in many species of the genus. In column structure the species closely resembles *P. pervillei* Rchb. f.

5. **Platycoryne pervillei** *Rchb. f.* in Bonplandia, **3,** 212 (1855) ; H. Perrier in Humbert, Fl. Madag. Orch. **1,** 66 (1939).

Habenaria depauperata Kraenzl. in Bremen Abh. **7,** 259 (1882).

H. pervillei (Rchb. f.) Kraenzl. in Engl. Bot. Jahrb. **16,** 209 (1892) et Orch. Gen. et Sp. **1,** 450 (1898).

H. tenuicaulis Rendle in Journ. Linn. Soc. Lond. Bot. **30,** 396 (1895).

H. buchwaldiana Kraenzl. in Engl. Bot. Jahrb. **24,** 503 (1898).

Platycoryne tenuicaulis (Rendle) Rolfe in Dyer, Fl. Trop. Afr. **7,** 257 (1898).

[*Platycoryne buchananiana*, non (Kraenzl.) Rolfe ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 257 (1898), partim].

[*Habenaria buchananiana*, non Kraenzl. ; Kraenzl. Orch. Gen. et Sp. **1,** 452 (1898), partim].

Habenaria flammea Kraenzl. in Engl. Bot. Jahrb. **28.** 173 (1900).

Distrib. : Tanganyika Territory, Zanzibar & Pemba, Nyasaland, S. Rhodesia, Mozambique, Madagascar.

Examination of the type specimens of all the above concepts, with the exception of *H. depauperata* Kraenzl., shows that they are all conspecific. Schlechter reduced Kraenzlin's species also to *P. pervillei* and there seems no reason for doubting the correctness of this view. It should be pointed

out that Rolfe and Kraenzlin mixed this species up with *P. buchananiana* (Kraenzl.) Rolfe. Both quite incorrectly referred *Habenaria buchwaldiana* to that species while in the Flora of Tropical Africa Rolfe included three different species in his *P. buchananiana*, several of the specimens cited by him belonging to the present species (viz. :—Manganja Hills, *Waller* ; Magomoro, *Waller* ; *Scott-Elliot* 8617).

The species may be distinguished from *P. buchananiana* by the fewer flowers in the inflorescence, the larger flowers with more acute tepals and especially by the rostellum. In the present species the rostellum is placed well in front of the column while the lateral lobes are much widened towards the base and taper gradually towards the broad apex. In *P. buchananiana* the rostellum is much nearer the anther, while the lateral lobes are relatively slender and are approximately the same width all the way along.

P. pervillei shows considerable variation in the size of the flowers, the intermediate sepal being 10–15 mm. in length, but the flower structure is remarkably constant.

6. **Platycoryne buchananiana** (*Kraenzl.*) *Rolfe* in Dyer, Fl. Trop. Afr. **7,** 257 (1898), partim.

Habenaria buchananiana Kraenzl. in Engl. Bot. Jahrb. **19,** 247 (1894), et Orch. Gen. et Sp. **1,** 452 (1898), partim.

H. kitondo De Wild. in Ann. Mus. Congo, **4,** 23 (1902).

H. stolzii Kraenzl. in Engl. Bot. Jahrb. **48,** 386 (1912), non Schltr.

H. kitimboana Kraenzl. l.c. **51,** 375 (1914).

H. ipyanae Schltr. l.c. **53,** 493 (1915).

Platycoryne kitondo (De Wild.) Summerh. in Kew Bull. **1956,** 219.

Distrib. : Belgian Congo, Tanganyika Territory, Nyasaland, N. & S. Rhodesia.

Here again is a species which has been described separately under several different names, the type specimens of which are shown by examination to be conspecific. At one time in my investigations I thought that it might be possible to separate *P. kitondo* as a distinct species with a longer rostellum but this distinction cannot be maintained when many gatherings are examined.

P. buchananiana is characterised by the rather small flowers in dense, often many-flowered heads and the narrow lateral lobes of the rostellum which are scarcely widened in the lower part. It has quite a wide distribution but all plants from Mozambique previously referred to the species prove to be referable to *P. pervillei* Rchb. f. *Habenaria ipyanae* is merely a form with a rather short spur, but other specimens with equally short spurs are known and in floral structure the two species agree.

In the Flora of Tropical Africa Rolfe included several species in his concept of *P. buchananiana*, including *P. pervillei* Rchb. f. and *P. mediocris* Summerh. and this has caused difficulty for subsequent workers.

7. **Platycoryne megalorrhyncha** *Summerh.* in Kew Bull. **1933,** 250 ; in Hook. Ic. Pl. **33,** t. 3238 (1934) et in Hutch. & Dalz. Fl. West Trop. Afr. **2,** 414 (1936).

Distrib. : British Cameroons.

A species readily recognised by the large rostellum, placed some distance in front of the anther ; although the middle lobe is long and sword-like, the lateral lobes are quite short. The leaves are relatively broad and rather close together and the inflorescence up to 9-flowered, but the flowers are not so closely placed as in *P. buchananiana* (Kraenzl.) Rolfe. The flowers themselves are relatively small, the intermediate sepal being about 6·5–7 mm. long and not very sharply pointed at the apex.

8. **Platycoryne paludosa** (*Lindl.*) *Rolfe* in Dyer, Fl. Trop. Afr. **7,** 256 (1898) ; Summerh. in Hutch. & Dalz. Fl. West Trop. Afr. **2,** 414, fig. 325 (1936).

Habenaria paludosa Lindl. in Journ. Linn. Soc. Lond. Bot. **6,** 139 (1862) ; Kraenzl. in Engl. Bot. Jahrb. **16,** 208 (1892) et Orch. Gen. et Sp. **1,** 449 (1898).

H. wilfordii Ridl. in Journ. Bot. Lond. **24,** 295 (1886) ; Kraenzl. in Engl. Bot. Jahrb. **16,** 210 (1892) et Gen. et Sp. Orch. **1,** 451 (1898).

H. aurea Kraenzl. in Engl. Bot. Jahrb. **16,** 209 (1892) et Orch. Gen. et Sp. **1,** 450 (1898).

Platycoryne aurea (Kraenzl.) Rolfe in Dyer, Fl. Trop. Afr. **7,** 256 (1898).

P. wilfordii (Ridl.) Rolfe, l.c. (1898).

Distrib. : West Africa, from Senegal to French Cameroons.

This species is readily recognised by the few-flowered heads, in which there are usually only 1–3 flowers, rarely as many as 4 or 5, and the rather short spur about 1 cm. long. The leaves are usually scattered more or less regularly along the stem and are relatively short and broad.

9. **Platycoryne latipetala** *Summerh.*, sp. nov. ; affinis *P. grandiflorae* Summerh., a qua foliis angustioribus, floribus minoribus, labello latiore late obovato vel elliptico, calcari breviore, stigmatibus minus acutis facile distinguenda.

Herba terrestris, erecta, usque ad 40 cm. alta, radicibus exceptis glaberrima ; tubera usque ad 1 cm. longe stipitata, ellipsoidea, circiter 1 cm. longa et 5 mm. diametro. *Caulis* ± rectus, basi radices graciles flexuosas atro-brunneas sparse tomentosas emittens, superne distanter foliatus, apice in inflorescentiam densam terminans, teres vel leviter angulatus, basi 2–3 mm. diametro. *Folia* 7–10 ; 2 inferiora vaginiformia, fere ad cataphyllis redacta, intermedia fere erecta, lanceolata vel lineari-lanceolata, acuta, usque ad 8·5 cm. longa et 8 mm. lata, superiora sursum sensim decrescentia, internodiis valde breviora, ad caulem adpressa. *Inflorescentia* sub-umbellata, 3–6-flora ; rhachis brevissima, usque ad 1·5 cm. longa ; bracteae imbricatae, late lanceolatae, acuminatae, usque ad 1·5 cm. longae, ovario pedicellato breviores, viridi-luteae. *Flores* leviter arcuatim sub-erecti vel erecto-patentes, clare lutei ; pedicellus cum ovario 1·4–1·7 cm. longus. *Sepalum* intermedium leviter incurvatum, late ovatum vel late ellipticum, valde convexum, apice obtusum apiculatum, 9·5–10·5 mm. longum, 6–8 mm. latum ; sepala lateralia patentia, oblique ovato-elliptica, apice subacuta apiculata, intermedio aequilonga, 5–5·5 mm. lata. *Petala* subfalcatim vel curvatim

oblique triangulari-lanceolata vel late lanceolata, apice acuta, 9–10·5 mm. longa, circiter 5 mm. lata, sepalo intermedio adhaerentia ; omnia tepala 5–7-nervia, nervis anastomosantibus. *Labellum* porrectum, late lanceolatum vel oblanceolatum, apice angustatum obtusum, 7·5–9·5 mm. longum, 4·5–6 mm. latum, plurinervium, ecallosum ; calcar incurvatum, duobus trientibus basalibus anguste cylindricum, triente distali modice inflatum apice ipso subacutum, in toto circiter 13 mm. longum et 1·5 mm. diametro. *Anthera* erecta, subacuta vel obtusa, 3·5–4 mm. alta, canalibus gracilibus 1·3–1·5 mm. longis rostelli lobis lateralibus adnatis, auriculis semiorbicularibus rugulosis. *Stigmata* porrecta, clavato-lanceolata, horizontaliter applanata, apice subacuta, 2 2·4 mm. longa ; rostelli lobus intermedius erectus, lanceolato-triangularis, acutus, antheram superans, circiter 4 mm. altus, papillosus, lobi laterales incurvati, quam intermedio multo minores, circiter 1 mm. longi ; ovarium leviter pluri-sulcatum.

Belgian Congo. Kasai, Atene, Nov. 1907, *Sapin* 39.

N. Rhodesia. Mwinilunga Distr., Sinkabolo Dambo, in boggy grassland, Dec. 1937, *Milne-Redhead* 3566 (type).

This species, like the following one, is characterised by the broad lateral sepals, which are not deflexed as normally in the genus and consequently give the flower a different appearance. In basic construction, however, *P. latipetala* agrees well with other species of *Platycoryne*, particularly the leaf arrangement, the short dense inflorescence, the large convex intermediate sepal and the detailed structure of the column. The present species is especially notable for the very broad petals and labellum ; all the perianth members are several-nerved with numerous cross-veins between the nerves.

10. **Platycoryne grandiflora** *Summerh.*, sp. nov. ; affinis *P. latipetalae* Summerh., a qua floribus majoribus, petalis labelloque angustioribus, calcari duplo longiore, stigmatibus elongatis acutioribus satis differt.

Herba terrestris, erecta, 30–50 cm. alta, fere omnino glabra ; tubera et radices non visa. *Caulis* rectus vel leviter flexuosus, teres vel leviter angulatus, basi 1–2 mm. diametro, basi cataphyllis vaginantibus pluribus sparse pubescentibus obtectus, superne laxe foliatus, apice in inflorescentiam pseudo-umbellatam terminans. *Folia* 4–5 ; inferius ± patens, basi vaginans, lanceolatum vel oblanceolatum, 4–9 cm. longum, 1–1·5 cm. latum, acutum ; superiora ± adscendentia vel ad caulem adpressa, vaginantia, internodiis multo breviora, anguste lanceolata, acuta, sursum decrescentia ; omnia folia chartacea. *Inflorescentia* pseudo-umbellata, 1–3-flora ; rhachis brevissima, usque ad 1 cm. longa ; bracteae herbaceae, imbricatae, lanceolatae, acuminatae, usque ad 2 cm. longae, ovario pedicellato breviores. *Flores* erecti vel sub-erecti, lutei ; pedicellus cum ovario interdum leviter arcuatus vel curvatus, 2–3 cm. longus. *Sepalum* intermedium erectum vel leviter recurvatum, late elliptico-lanceolatum, apice rotundatum apiculatum, 15–17 mm. longum, 7·5–8·5 mm. latum, convexum, quinquenervium ; sepala lateralia patentia, oblique anguste elliptico-lanceolata vel anguste lanceolata, apice obtusa vel subacuta, 16–18·5 mm. longa, 5·5–6·5 mm. lata, subquinquenervia. *Petala* erecta, oblique falcatim vel valde curvatim ligulato-lanceolata vel lanceolata, apice acuta, 15·5–18 mm. longa, 5–5·5 mm. lata, sepalo intermedio agglutinata, subquinquenervia, sup-

erne textura crassiora ; omnia tepala nervis anastomosantibus. *Labellum* deflexim porrectum, anguste ellipticum vel oblanceolato-ellipticum, apice rotundatum, 13-15 mm. longum, mm. 4–5 latum, plurinervium ; calcar dependens, leviter incurvatum, dimidio basali anguste cylindricum, dimidio apicali modice inflatum, apice ipso angustatum subacutum, 20–26 mm. longum. *Anthera* erecta, apice subacuta, circiter 5 mm. alta, loculis parallelis, canalibus incurvatis gracilibus circiter 2·5 mm. longis, auriculis oblongis rugulosis. *Stigmata* porrecta, fusiformi-clavata, apice ± acutata, 4·4·5 mm. longa ; rostellum erectum, 5 mm. altum, antheram valde superans ; lobus intermedius ovatus, acutus, circiter 3·5 mm. longus et 2–2·5 mm. latus, lobi laterales breviores, incurvati, circiter 1·25 mm. longi, apice truncati ; ovarium leviter pluri-sulcatum.

Belgian Congo. Bas-Congo, Mangombe, in marsh, Feb. 1952, *Callens* 3300 (type) ; Kisantu, Dec. 1924, *Vanderyst* 14395 ; Kimban, Sept. 1925, *Vanderyst* 15339.

This striking species is characterised by the large flowers with spreading lateral sepals, the few-flowered inflorescences, the tall broad rostellum middle-lobe and the long pointed stigmas. In general floral structure it falls clearly into the genus but is rather aberrant in appearance. It is most closely allied to *P. latipetala* Summerh., described above, but differs in the larger flowers, narrower more acute petals and longer spur.

11. **Platycoryne macroceras** *Summerh.*, sp. nov. ; ab aliis speciebus inflorescentiis unifloris rarius bifloris, calcari plus 5 cm. longo facile distinguitur.

Herba terrestris, erecta, usque ad 35 cm. alta, tuberis et radicibus exceptis glaberrima ; tubera ovoidea vel ellipsoidea, 1–2 cm. longa, 0·5–1·5 cm. diametro, tomentosa. *Caulis* saepius leviter flexuosus, gracilis, teres vel leviter angulatus, basi radices flexuosas graciles emittens et cataphyllis paucis vaginantibus obtectus, superne laxe foliatus, apice uni- vel rarissime biflorus. *Folia* 3–6, adscendentia vel erecto-patentia, infima vaginiformia, superiora linearia vel lineari-lanceolata, acuta, usque ad 7 cm. longa et 4 mm. lata, sursum sensim decrescentia in bractea abeuntia. *Inflorescentia* fere semper uniflora sed rarissime biflora ; bractea herbacea, lanceolata, acuminata, 1·5–3 cm. longa, vaginans, ovario pedicellato multo brevior. *Flores* erecto-arcuati, albi vel rarius rubri ; pedicellus gracilis, teres, 4–8 cm. longus. *Sepalum* intermedium fere erectum vel inclinatum, valde convexum, ovatum, apice rotundatum minute apiculatum, circiter 12 mm. longum, 8–9 mm. latum, subseptemnervium ; sepala lateralia deflexim patentia, oblique et leviter curvatim lanceolato-oblonga, apice obtusa, 13–14 mm. longa, 4–5 mm. lata, subquinquenervia. *Petala* erecta, cum sepalo intermedio agglutinata, oblique late triangulari-ovata, apice subacuta, margine antico rotundata dilatata, circiter 11·5 mm. longa, 7–8·5 mm. lata, subseptem- vel subnovemnervia. *Labellum* deflexim incurvatum, ligulatum, basi angustatum, apice obtusum, longitudinaliter convexum, circiter 15 mm. longum, 3·5–4·5 mm. latum ; calcar pendens, dimidio apicali incurvatum, 5–6·5 cm. longum, inferne anguste cylindricum, parte quarta apicali inflatum, 2·5–3 mm. diametro, apice viride. *Anthera* erecta, apice apiculata, circiter 5·5 mm. alta, loculis parallelis, canalibus brevissimis, auriculis transverse semi-ellipticis rugulosis. *Stigmata* deflexim porrecta, breviter et obtuse clavata, circiter 3 mm. longa ; rostellum

erectum vel leviter recurvatum, anthera paulo brevius, obscure trilobatum, ± triangulare, superne angustatum apice subacutum, inferne dilatatum, lobis lateralibus fere nullis, in toto 5 mm. altum, explanatum basi 5–6 mm. latum ; ovarium incurvatim arcuatum, 1–1·5 cm. longum, leviter pluri-sulcatum.

N. Rhodesia. Mwinilunga Distr., Kalenda Plain opposite Matonchi Farm, on shallow soil overlying laterite, seasonally wet, Nov. 1937, *Milne-Redhead* 3300 (type) ; Abercorn Distr., Abercorn, by Tsetse Control point, 1500 m. alt., in sandy pan liable to flooding, Jan. 1955, *Richards* 3802 ; Abercorn, 1500 m. alt., in sandy soil among rocks in open bush, Dec. 1932, *Gamwell* 99 ; Kasama Distr., 6 miles from Kasama towards Isoka, 1350 m. alt., in shallow soil covering flat rocks in wet dambo, Jan. 1956, *Benson* NR 116.

This truly remarkable species is rather isolated in the genus, as, in addition to the large flowers and very long spur, the rostellum structure is somewhat atypical. The side lobes are hardly developed, the middle lobe consisting of a narrow ligulate upper part and a much widened lower part, the viscidia of the pollinia resting in slight incisions on each side at the very base of this widened part. Corresponding with this the anther canals are extremely short or, indeed, scarcely developed.

12. **Platycoryne trilobata** *Summerh.*, sp. nov. ; affinis *P. protearum* (Rchb. f.) Rolfe, a qua labello paulo infra medium distincte trilobato satis differt.

Herba terrestris, erecta, 30–40 cm. alta, radicibus exceptis glaberrima ; tubera ± globosa, circiter 1 cm. longa et diametro. *Caulis* rectus vel leviter flexuosus, teres, basi circiter 2 mm. diametro, basi radices flexuosas pallide brunneas puberulas emittens, superne laxe foliatus, apice in inflorescentiam paucifloram terminans. *Folia* 5–6 ; 1–2 infima fere ad vaginas redacta, intermedia ± patentia, lanceolata, acuta, basi vaginantia, usque ad 4 cm. longa et 7 mm. lata, superiora caulis adpressa, decrescentia, in bracteas abeuntia. *Inflorescentia* 3–4-flora ; rhachis gracilis, 3–5 cm. longa ; bracteae vaginantes, lanceolatae, acuminatae, 1–2·5 cm. longae, ovario pedicellato multo breviores. *Flores* erecti vel suberecti, partim virides partim lutei ; pedicellus gracilis, 2·5–3 cm. longus. *Sepalum* intermedium leviter incurvatum, valde convexum, ovatum, apice subacutum vel apiculatum, fere cucullatum, circiter 8 mm. longum et 5 mm. latum, quinquenervium ; sepala lateralia deflexa, oblique lanceolata, apice obtusa, circiter 7·5 mm. longa et 2·5 mm. lata, subquinquenervia ; omnia sepala viridia. *Petala* erecta, sepalo intermedio agglutinata, oblique et leviter curvatim oblongo-lanceolata, apice obtusa, margine antico prope basin lobulo minuto rotundato instructa, sub-quinquenervia, lutea. *Labellum* deflexum, paulo infra medium distincte trilobatum, in toto circiter 5 mm. longum et (explanatum) 4 mm. latum, luteum ; lobus intermedius oblongus, convexus, apice rotundatus, fere 4 mm. longus, 2 mm. latus, plurinervius ; lobi laterales reflexi, anguste ligulati, apice obtusi, 1·5 mm. longi et 0·75 mm. lati ; calcar dependens, circiter 3 cm. longum, dimidio basali anguste cylindricum, dimidio apicali leviter inflatum, apice ipso subacuto. *Anthera* erecta, longe apiculata, 3 mm. alta, loculis parallelis, canalibus adscendentibus 2·5 mm. longis, auriculis fere semiorbicularibus rugulosis. *Stigmata* porrecta vel leviter decurvata, crasse clavata, apice fere truncata obtusissima, circiter 3 mm. longa ; rostellum erectum, fere 5 mm. altum, antheram valde superans ; lobus intermedius triangulari-lanceolatus,

apice acutus, leviter concavus, circiter 2·5 mm. longus ; lobi laterales incurvatim porrecti, brevissimi, apice truncati ; ovarium leviter arcuatum, 10–13 mm. longum, leviter pluri-sulcatum.

Angola. Ganda Distr., Alto Catumbela, 1350 m. alt., in swampy ground, Oct. 1940, *Faulkner* A452 (type).

This species is clearly allied to *P. protearum* (Rchb. f.) Rolfe but is easily recognised by the distinctly 3-lobed labellum. The lateral lobes arise from the lower part of the labellum but some distance above the base, and are different in both position and shape from those in *P. crocea* (Rchb. f.) Rolfe and its allies. The rostellum is similar to that in *P. protearum* and in other respects the two species are very similar.

13. **Platycoryne brevirostris** *Summerh.*, sp. nov. ; a *P. trilobata* Summerh. floribus minoribus, a *P. protearum* (Rchb. f.) Rolfe labello infra medium trilobato, ab utraque foliis angustioribus, rostelli lobo intermedio quam lateralibus breviore facile distinguitur.

Herba terrestris, erecta, 15–30 cm. alta, tuberis et radicibus exceptis glaberrima ; tubera ellipsoidea vel ovoideo-ellipsoidea, 1–1·5 cm. longa, 6–10 mm. diametro, sparsiuscule tomentosa. *Caulis* rectus vel leviter flexuosus, gracilis, teres vel leviter angulatus, basi 1–1·5 mm. diametro, basi radices flexuosas graciles tomentosas emittens, superne plurifoliatus, apice in inflorescentiam terminans. *Folia* 5 8 ; infima vaginiformia, recurvata, superiora 3 contigua, ± suberecta, interdum leviter recurvata, lineari-lanceolata vel linearia, acuta, usque ad 5 cm. longa et 4 mm. lata, suprema distantia, linearia vel lanceolata, sursum decrescentia, summa bracteis similia sed angustiora. *Inflorescentia* laxiuscule 2–7-flora ; rhachis 1·5–6 cm. longa, gracilis, teres ; bracteae virides, herbaceae, lanceolatae, acutae vel breviter acuminatae, 7–17 mm. longae, ovario pedicellato breviores vel rarissime aequantes. *Flores* suberecti, arcuati, partim virides partim aurantiaco- vel flavido-virides ; pedicellus cum ovario 1·5–2 cm. longus. *Sepalum* intermedium leviter incurvatum, ellipticum vel ovato-ellipticum, apice rotundatum apiculatum, convexum, 4·5–5 mm. longum, circiter 3 mm. latum, subquinquenervium ; sepala lateralia deflexa, oblique elliptico-oblonga, apice apiculata, 5–6 mm. longa, 2–2·5 mm. lata, quadrinervia ; omnia sepala viridia. *Petala* erecta, sepalo intermedio agglutinata, leviter curvatim lanceolato-ligulata, apice subacuta, basi leviter dilatata, circiter 4·5 mm. longa et 1·5 mm. lata, trinervia, aurantiaco- vel flavido-viridia. *Labellum* deflexum vel leviter recurvatum, medio vel paulo infra medium trilobatum, in toto 3·7–5 mm. longum, explanatum inter lobos laterales 2 mm. latum, aurantiaco-viride ; lobus intermedius oblongus, apice rotundatus vel obtusus, 2–4 mm. longus, circiter 1 mm. latus, plurinervius ; lobi laterales ligulati vel triangulares, 0·2–1·2 mm. longi, circiter 0·3 mm. lati ; calcar dependens, 15–18 mm. longum, cylindricum, dimidio apicali leviter inflatum, apice obtusum. *Anthera* leviter inclinata, apice breviter apiculata, 3–4 mm. alta, loculis parallelis, canalibus porrectis gracilibus circiter 2·5 mm. longis, auriculis semiorbicularibus vel fere quadratis rugulosis. *Stigmata* leviter deflexim porrecta, crasse obtuseque clavata, 1·5–1·75 mm. longa ; rostellum porrectum, trilobatum, antheram aequans vel brevius, in toto 2·5 mm. altum ; lobus intermedius quam lateralibus valde brevior, triangularis vel fere ad dentam redactus,

acutus, usque ad 0·4 mm. longus ; lobi laterales oblongi, apice oblique truncati, circiter 1 mm. longi ; ovarium leviter arcuatum vel curvatum, leviter pluri-sulcatum.

N. Rhodesia. Mwinilunga Distr., Kalenda Dambo, on boggy soil overlying laterite, Dec. 1937, *Milne-Redhead* 3811 (type) ; between Rivers Ndamba (Mundamba) and Nkoki, on shallow soil overlying laterite, not very wet, Jan. 1938, *Milne-Redhead* 3984.

Another species similar in inflorescence characters to *P. protearum* (Rchb. f.) Rolfe but with narrower leaves somewhat bunched at the base and smaller flowers. The labellum is distinctly 3-lobed just below the middle as in *P. trilobata* Summerh. but the middle lobe of the rostellum is much shorter than the laterals which are relatively long and narrow. In this respect the present species differs from the other species of this affinity, in all of which the middle lobe is much longer than the shoulder-like lateral lobes.

At Kalenda Dambo Mr. Milne-Redhead collected a number of plants which were intermediate in most characters between the above species and *P. guingangae* (Rchb. f.) Rolfe, which species he also collected there under his number 3810. There seems little doubt that these were naturally occurring hybrids between these two species.

14. **Platycoryne heterophylla** *Summerh.*, sp. nov. ; a *P. elegantula* (Kraenzl.) Summerh. foliis basalibus latioribus caulinis dissimilibus satis differt.

Herba terrestris, erecta, gracilis, 10–40 cm. alta, tuberis et radicibus exceptis glaberrima ; tubera pro rata parva, ellipsoidea vel ellipsoideo-ovata, interdum breviter stipitata, 5–10 mm. longa et circiter 5 mm. diametro, sparse tomentosa. *Caulis* rectus vel leviter flexuosus, gracilis, basi 1–1·5 mm. diametro, radices leviter flexuosas brunneas graciles puberulas emittens, cataphylla parva vaginante instructus, plurifoliatus, apice in inflorescentiam brevem paucifloram terminans. *Folia* 5–8 ; inferiora 2–3 fere basalia, ± patentia, lanceolata vel anguste lanceolata, apice breviter acuminata, 1–5 cm. longa, 3–6 mm. lata, textura tenuia, superiora inferioribus dissimilia, distantia, ± cauli adpressa vel vaginantia, lineari-lanceolata, apice acuminata, usque ad 3 cm. longa. *Inflorescentia* brevissima, fere subumbellata, 1–3-flora ; bracteae herbaceae, lanceolatae, acuminatae, 7–10 mm. longae, pallide virides, ovario pedicellato breviores. *Flores* erecti vel paulo divergentes, pallide aurantiaci ; pedicellus cum ovario 10 ·15 mm. longus. *Sepalum* intermedium erectum vel leviter inclinatum, valde convexum, ovatum, apice apiculatum, 6–7·5 mm. longum, 3·5–6 mm. latum, quinque- vel subquinquenervium ; sepala lateralia deflexa, oblique lanceolata, apice acuta, 6–7·5 mm. longa, 2·5–3·5 mm. lata, tri- vel subquinquenervia. *Petala* erecta, sepalo intermedio agglutinata, leviter curvatim et oblique lanceolata, apice subacuta vel fere obtusa, 4·5–6·5 mm. longa, 2–2·5 mm. lata, 2–3-nervia. *Labellum* porrectum, basi tridentatum, 5–6·5 mm. longum ; lobus intermedius ligulatus, apice obtusus vel emarginatus, 3·5–4·7 mm. longus, circiter 1·3 mm. latus, ± convexus ; lobi laterales dentiformes vel triangulares, deflexi, 0·3–0·5 mm. longi ; calcar dependens, cylindricum, prope apicem leviter inflatum, 8·5–9·5 mm. longum, interdum apice breviter bilobulatum. *Anthera* leviter incurvata, apice apiculata, 3–4 mm. alta, loculis parallelis, canalibus porrectis gracilibus circiter 2 mm. longis

labelli lobis lateralibus adnatis, auriculis semi-orbicularibus rugulosis. *Stigmata* fere porrecta vel leviter decurvata, crasse capitato-clavata, apice obtusissima, circiter 1·75 mm. longa, rugulosa ; rostellum erectum, 3·5 mm. longum, antheram superans, lobo intermedio lanceolato acuto circiter 2·5 mm. longo, lobis lateralibus brevioribus ligulatis apice truncatis circiter 1·5 mm. longis ; ovarium leviter curvatum, obscure plurisulcatum.

Angola. Longa River, above Quiriri, 1250 m. alt., Feb. 1900, *Baum* 690.

N. Rhodesia. Mwinilunga Distr., Sinkabolo Dambo, on boggy grassland, Jan. 1937, *Milne-Redhead* 4382 (type).

This species seems to be allied to *P. elegantula* (Kraenzl.) Summerh. but differs mainly in the leaf pattern. In the present species there are a few somewhat spreading and relatively broad leaves forming a tuft at the base while the rest of the leaves are much narrower and more or less closely clasping the stem. In *P. elegantula* all the leaves are narrower and the lower ones forming the tuft are very similar to those farther up the stem though the leaves decrease in size upwards as in other species of the genus.

15. **Platycoryne elegantula** (*Kraenzl.*) *Summerh.* in Hutch. & Dalz. Fl. West Trop. Afr. **2,** 414 (1936).

Habenaria elegantula Kraenzl. in Engl. Bot. Jahrb. **51**, 376 (1914).

Distrib. : British and French Cameroons, Belgian Congo, Urundi, Tanganyika Territory, N. Rhodesia.

This species is clearly allied to *P. crocea* (Schweinf. ex Rchb. f.) Rolfe and *P. montis-elgon* (Schltr.) Summerh. It differs from the former in the lower stature, narrower leaves and larger flowers, and from the latter in the more slender growth and narrower and shorter leaves. There is still, however, some doubt as to whether these three, together with *P. ochrantha* (Schltr.) Summerh., are not really sub-species of one widely ranging species. *P. elegantula* occupies the western and southern parts of the general range of the group. For the present I think it most convenient to maintain them all as distinct though closely allied species.

16. **Platycoryne montis-elgon** (*Schltr.*) *Summerh.* in Kew Bull. **1932,** 508.

Habenaria montis-elgon Schltr. in Notizbl. Bot. Gart. Berl. **8,** 225 (1922).

Distrib. : Sudan, Uganda, Kenya Colony.

Characterised by the low stature, the bunch of relatively long and broad leaves at the base of the stem and the well-developed lateral lobes at the base of the labellum. The flowers are relatively large, the intermediate sepal being usually over 8 mm. in length, and are yellow or orange in colour. The species grows at altitudes of 5700–8000 feet (1700–2400 m.) and is often very abundant in short turf among rocks.

17. **Platycoryne ochrantha** (*Schltr.*) *Summerh.* in Kew Bull. **1947,** 125 (1948).

Habenaria ochrantha Schltr. in Engl. Bot. Jahrb. **53,** 494 (1915).

Distrib. : southern Tanganyika Territory.

P. ochrantha is similar to *P. elegantula* (Kraenzl.) Summerh. but the leaves in the basal tuft are much longer and rather broader. The labellum is longer, with the middle lobe somewhat widened towards the base and the lateral lobes spreading and well developed though not so long relatively as in *P. montis-elgon* (Schltr.) Summerh. The species is restricted so far as is known to a small area on each side of the northern end of Lake Nyasa.

18. **Platycoryne crocea** (*Schweinf. ex Rchb. f.*) *Rolfe* in Dyer, Fl. Trop. Afr. **7**, 257 (1898).

Habenaria crocea Schweinf. ex Rchb. f. Otia Bot. Hamburg. 57 (1878).

Distrib. : Sudan.

This species is characterised by the relatively tall slender habit and small flowers with rather blunt " helmet ". The basal tuft of leaves is not so well developed and indeed in this respect the species approaches the next two species in which the leaves are all scattered along the stem. The leaves are also considerably broader than in the last three species.

19. **Platycoryne micrantha** *Summerh.*, sp. nov. ; *P. croceae* (Schweinf. ex Rchb. f.) Rolfe similis sed foliis dissitis haud caulis basi caespitosis, calcari paulo breviore apice obtusiore satis differt.

Herba terrestris, erecta, 20–35 cm. alta, tuberis et radicibus exceptis glaberrima. *Tubera* ± breviter stipitata, ellipsoidea, 1–1·5 cm. longa, 4–7 mm. diametro, sparse tomentosa. *Caulis* rectus vel leviter flexuosus, gracilis, basi radices graciles flexuosas brunneas emittens, superne ± distanter foliatus, basi circiter 1·5 mm. diametro, teres vel leviter angulatus. *Folia* 5–7 ; 2–3 inferiora ± patentia, lanceolata, acuta vel acuminata, 1–3·5 cm. longa, usque ad 7 mm. lata, superiora minora, cauli appressa, ± vaginantia, lanceolata, acuminata, sursum sensim decrescentia. *Inflorescentia* brevis, dense 2–6-flora ; rhachis usque ad 13 mm. longa, ± angulata ; bracteae late lanceolatae, acuminatae, usque ad 1 cm. longae, ovario pedicellato breviores. *Flores* suberecti, aurantiaci ; pedicellus cum ovario leviter curvatus vel arcuatus, 1–1·5 cm. longus. *Sepalum* intermedium erectum, late ovatum, apice obtusum apiculatum, valde convexum, 4·3–5·3 mm. longum, explanatum 4–4·5 mm. latum, quinquenervium ; sepala lateralia deflexa, oblique oblongo-lanceolata, apice subacuta, 4·5–5·5 mm. longa, 2–2·5 mm. lata, tri- vel subquinquenervia. *Petala* erecta, fere libera, curvatim vel leviter falcatim triangulari-lanceolata, apice obtusa, 4–4·5 mm. longa, 1·7–2 mm. lata, trinervia. *Labellum* deflexim porrectum, basi trilobatum, in toto 4·5–5 mm. longum ; lobus intermedius ligulatus, apice obtusus, 3·5–4 mm. longus, 0·75–1 mm. latus, convexus, trinervius ; lobi laterales ab intermedio leviter divergentes, lineari-ligulati, apice subacuti, 1–1·5 mm. longi, circiter 0·4 mm. lati ; calcar dependens, dimidio basali anguste cylindricum, dimidio distali clavatim inflatum, apice obtusum vel rotundatum, 10·5–12·5 mm. longum. *Anthera* erecta vel leviter inclinata, apice breviter apiculata, 2·5–3 mm. alta, canalibus porrectis angustis circiter 1·5 mm. longis, auriculis semi-orbicularibus rugulosis. *Stigmata* leviter deflexa, crasse rotundato-clavata, 1–2 mm. longa ; rostellum late trilobatum, anthera brevius, lobo intermedio erecto an-

guste triangulari acuto 1–1·5 mm. longo, lobis lateralibus oblongis apice truncatis 1–1·3 mm. longis ; ovarium leviter curvatum, leviter plurisulcatum.

Angola. Lunda Distr., hills by R. Chiumbe at Dala, July 1927, *Carisso & Mendonça* 562 ; Moxico Distr., between Vila Leuso and Moxico, 1240 m. alt., May 1937, *Exell & Mendonça* 1582 ; Simoge River, 1240 m. alt., May 1937, *Exell & Mendonça* 1657.

N. Rhodesia. Mwinilunga Distr., just W. of Dobeka Bridge, in boggy grassland, Oct. 1937, *Milne-Redhead* 2981 (type) ; R. Kasompa, in boggy grassland, Oct. 1937, *Milne-Redhead* 2668.

This species is similar to *P. crocea* (Schweinf. ex Rchb. f.) Rolfe in general habit but has even smaller flowers. The lateral lobes of the labellum, however, are longer and narrower and similar to those in *P. guingangae* (Rchb. f.) Rolfe ; this latter species can be distinguished by the bilobed petals. From *P. mediocris* Summerh. the present species differs in the more slender growth, the smaller flowers, the narrower lateral lobes of the labellum and the relatively longer lateral arms of the rostellum.

20. **Platycoryne mediocris** *Summerh.*, sp. nov. ; affinis *P. micranthae* Summerh. et *P. elegantulae* (Kraenzl.) Summerh., ab illa floribus majoribus, labelli lobis lateralibus dentiformibus, rostelli lobis lateralibus brevioribus, ab hac foliis latioribus haud basi caespitosis satis distinguenda.

Herba terrestris, erecta, gracilis, 20–45 cm. alta, tuberis et radicibus exceptis glaberrima ; tubera anguste ellipsoidea, ellipsoidea vel fere globosa, ± stipitata, 5–18 mm. longa, 5–9 mm. diametro, sparse tomentosa. *Caulis* rectus vel leviter flexuosus, teres, basi radices flexuosas graciles sparse tomentosas emittens, cataphyllis 1–2 vaginantibus instructus, superne distanter foliatus, apice in inflorescentiam brevem terminans. *Folia* 5–8, sparsa, suberecta vel ± patentim divergentia, lanceolata vel lineari-lanceolata, acuminata, inferiora 2·5–6 cm. longa et 4–9 mm. lata, superiora sursum decrescentia, textura tenuia. *Inflorescentia* brevis, fere umbelliformis, 2–5-flora ; bracteae late lanceolatae, acuminatae, usque ad 2 cm. longae, ovario pedicellato satis breviores. *Flores* suberecti vel leviter arcuatim divergentes, aurantiaci ; pedicellus cum ovario 1·5–2·5 cm. longus. *Sepalum* intermedium erectum, late ovatum, apice leviter recurvatum acutum vel apiculatum, valde convexum, 7–10·5 mm. longum, 5–6 mm. latum, quinque- vel sub-quinquenervium, venis reticulatis ; sepala lateralia deflexa, oblique oblongo-lanceolata, apice acuta, 8–10 mm. longa, 2–3·7 mm. lata, quinque- vel sub-quinquenervia. *Petala* erecta, sepalo intermedio agglutinata, curvatim vel leviter falcatim anguste oblongo-lanceolata, apice subacuta, 7–10 mm. longa, 2–3 mm. lata, tri- vel quadrinervia. *Labellum* deflexum, basi trilobatum, in toto 6·5–10·5 mm. longum ; lobus intermedius ligulatus, apice rotundatus vel obtusus, convexus, 5·5–6·5 mm. longus, 1–2 mm. latus, plurinervius ; lobi laterales dentiformes vel triangulares, patentes vel incurvati, usque ad 0·5 mm. longi et lati ; calcar dependens, duobus trientibus basalibus anguste cylindricum, triente apicali clavato-inflatum, 10–16·5 mm. longum. *Anthera* erecta, apice apiculata, 3–5 mm. alta, canalibus porrectis 1–2 mm. longis, auriculis semi-orbicularibus rugulosis. *Stigmata* porrecta vel ± deflexa, crasse clavata, apice subacuta, 2–3 mm. longa ; rostellum erectum, anthera brevius vel interdum fere aequans,

lobo intermedio anguste triangulari-lanceolato acuto 2–2·5 mm. longo, lobis lateralibus oblongis apice truncatis 0·7–1·6 mm. longis ; ovarium arcuatum, leviter plurisulcatum.

TANGANYIKA TERRITORY. Rungwe Distr., Mwakalele, 1500 m. alt., common, Jan. 1933, *Davies* D820 ; Rungwe Mts., new road T.O., 1590 m. alt., in grasslands, *Davies* D838a ; Songea Distr., Matakas, near Kasembe, among grasses, Jan. 1918, *McLoughlin* 45 ; 8 km. W. of Songea, 990 m. alt., in boggy grassland, Feb. 1956, *Milne-Redhead & Taylor* 8654 (type) ; 12 km. E. of Songea by Nonganonga stream, 1020 m. alt., in sandy ground at edge of *Brachystegia-Uapaca* woodland and boggy grassland, Feb. 1956, *Milne-Redhead & Taylor* 8654A ; Rovuma River, Nyakawali, 600 m. alt., in open forest on sandy soil, Jan. 1937, *Zimmer* 267.

NYASALAND. Plateau of Mt. Zomba, 1500–1800 m. alt., *Whyte* ; Makwapale Experimental Station, 705 m. alt., in bush, Jan. 1937, *Lawrence* 253 ; Loangwene, Chifumbozi, Jan. 1897, *Nicholson* ; Shire Highlands, *Buchanan* 318 ; Near Mwenikumbulo, Misuku Hills, 900 m. alt., in *Brachystegia* woodland, March 1953, *Williamson* 209 ; no locality, *Buchanan* 739.

N. RHODESIA. Eastern Prov., Katete River, on Great East Road, 1050 m. alt., in boggy place near stream, Jan. 1957, *Wright* 123 ; Katete, St. Francis' Hospital, 1050 m. alt., in open bush, March 1956 (in fruit) *Wright* 82 ; near Fort Jameson, 585 m. alt., on banks of stream, Jan. 1930, *Bush* 7.

S. RHODESIA. No locality, *Hislop* 93 ; Urungwe Distr., Karoi, at edge of vlei, March 1947, *Wild* 1860 (S. Rhod. Gov. Herb. No. 16206) ; Salisbury Distr., Mazoe, 1350 m. alt., on light grey soil, Jan. 1908, *Eyles* 557 ; Umtali Distr., Nyumkwarara valley, 1050–1200 m. alt., Feb. 1935, *Gilliland* 1542 ; Victoria Distr., 1909, *Monro* 864.

This species has no outstanding features, as the specific epithet implies, but is undoubtedly distinct in its combination of characters from all the other species. Here again the leaves are spread along the stem with no bunching at the base. The species is nearest to *P. micrantha* Summerh. but has larger flowers, smaller lateral lobes to the labellum and shorter rostellum arms. It has an extensive distribution in a N.–S. direction in East Africa but does not seem to extend into the Belgian Congo or western Rhodesia.

P. mediocris, like *P. pervillei* Rchb. f., was included by Rolfe under *P. buchananiana* in the Flora of Tropical Africa, but can be easily distinguished by the spreading leaves, decurved labellum and small teeth at the base of the latter organ.

21. **Platycoryne guingangae** (*Rchb. f.*) *Rolfe* in Dyer, Fl. Trop. Afr. **7,** 258 (1898).

Habenaria guingangae Rchb. f. in Flora, **48,** 179 (1865) ; Kraenzl. in Engl. Bot. Jahrb. **16,** 207 (1892), et Gen. et Sp. Orch. **1,** 448 (1897).

H. poggeana Kraenzl. in Engl. Bot. Jahrb. **16,** 207 (1892), et Gen. et Sp. Orch. **1,** 448 (1897).

Platycoryne poggeana (Kraenzl.) Rolfe in Dyer, Fl. Trop. Afr. **7,** 258 (1898).

Distrib. : Gabon, Belgian Congo, Angola, N. Rhodesia.

Although I have not seen the type of *Habenaria poggeana* Kraenzl., destroyed during the war, I have little doubt of it being conspecific with *P. guingangae*. I have seen a large number of gatherings referable to the present species from the Belgian Congo, from west and east of the type locality of Kraenzlin's species. It is difficult indeed to see on what grounds Kraenzlin separated *H. poggeana* since his keys in both of his monographic accounts (see references above) are manifestly erroneous. He says in both places that the anticous lobe of the petals is obsolete in

H. guingangae, which statement is at variance both with the original description in " Flora " and with his own descriptions of the species following the keys !

The species may be distinguished from all others in the genus by the presence of this small anticous petal lobe ; associated with this are the relatively long and narrow lateral lobes of the labellum. The leaves are evenly distributed along the stem while the inflorescence is dense and often bears quite a number of flowers.

Polystachya albescens *Ridl.* in Bol. Soc. Brot. **5,** 199 (1888).

P. imbricata Rolfe in Kew Bull. **1893,** 172 ; Summerh. in Kew Bull. **1956,** 225–227.

In a previous paper (see reference above) I dealt with *P. imbricata* Rolfe, dividing the species into 4 sub-species each with a definite geographical distribution. Among the plants provisionally included under subsp. *musozensis* (Rendle) Summerh. were several collections from São Tomé and Principe which, however, I suggested might be referable to a distinct sub-species. I have since seen several more gatherings of this group from these islands which have strengthened my view of their distinctness from subsp. *musozensis*. In the course of studies of other *Polystachyas* from the islands I found it necessary to borrow from Coimbra the type specimen of *P. albescens* Ridl., a species very little known and not seen by either Rolfe or Kraenzlin during their treatment of the African species of the genus. On examination the specimen, which was collected on the Pico of S. Tomé by Moller, though a very poor one and certainly not suitable as a basis of a new species, is clearly conspecific with others obtained lower down on the same mountain by recent collectors. These specimens, in their turn, are evidently referable to *P. imbricata* in its broad sense and, since the name *P. albescens* has five years priority over *P. imbricata*, it must be adopted as the name for the whole group.

The following names must therefore be adopted for the various subspecies included under *P. albescens*, most of these having been formerly under the name *P. imbricata*.

subsp. **albescens**

Type Specimen :—Pico de S. Tomé, *Moller* (Herb. Coimbra).

The typical subspecies is characterised by the rather narrow leaves, the slender branches of the inflorescence which themselves are usually unbranched with the bracts close together, and the not very clearly trilobed labellum. In this latter respect the subspecies differs from subsp. *musozensis* but approaches subsp. *kraenzlinii* (Rendle) Summerh. The claw of the labellum is only shortly pubescent, not setulose as in subsp. *musozensis*. The subspecies occurs in the islands of S. Tomé and Principe.

subsp. **imbricata** (*Rolfe*) *Summerh.*, comb. nov.

P. imbricata Rolfe in Kew Bull. **1893,** 172.

P. imbricata, subsp. *imbricata* ; Summerh. in Kew Bull. **1956,** 226.

subsp. **kraenzlinii** (*Rolfe*) *Summerh.*, comb. nov.

P. kraenzlinii Rolfe in Dyer, Fl. Trop. Afr. **7,** 112 (1897).

P. imbricata, subsp. *kraenzlinii* (Rolfe) Summerh. l.c. 226.

subsp. **musozensis** (*Rendle*) *Summerh.*, comb. nov.

P. musozensis Rendle in Journ. Linn. Soc. Lond. Bot. **37,** 217 (1905).

P. imbricata, subsp. *musozensis* (Rendle) Summerh. l.c. 226.

As a result of the separation of subsp. *albescens*, the present subspecies is now restricted to the eastern Belgian Congo and to Uganda.

subsp. **angustifolia** (*Summerh.*) *Summerh.* comb. nov.

P. imbricata subsp. *angustifolia* Summerh. l.c. 227.

Stolzia peperomioides (*Kraenzl.*) *Summerh.* in Kew Bull. **1953,** 142.

In the above reference I suggested that Kraenzlin's *Bulbophyllum peperomioides* was referable to the genus *Stolzia* both on account of Kraenzlin's description and figure and of the existence of the very similar *Stolzia diffusa* Summerh.

I have now seen a gathering made by Dr. J. Bequaert (No. 2777) in the Ituri Forest in the Belgian Congo which is an excellent match of the picture of *B. peperomioides* in Mildbraed's book (Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907–1908, **2,** t. IX fig. 2A : 1910). In vegetative features and inflorescence characters the two agree in all points. Bequaert's material also shows that the leaf is constructed just as in *S. diffusa* with a long slender sheath which is articulated to the petiole and lamina. The inflorescence clearly arises at the apex of the swollen pseudobulb, in the axil of the leaf.

In floral characters *Bequaert* 2777 agrees in most points with the published description, particularly as regards the petals, labellum and very small column. There are 8 pollinia present, 4 larger and 4 smaller and the anther, though broader than usual, is similar in general features to that in other species of *Stolzia*. In the picture, however, the sepals are shown as united to form a cupular tube, but I do not find such a structure in the Bequaert material. The sepals are certainly joined for about 1 mm. at the base, as in other species of *Stolzia*, and I suspect that the relatively long cup shown in the picture is a mistake on the part of the artist. I have not seen any comparable sepaline tube elsewhere in the genus.

The examination of this material makes it clear that *Bulbophyllum peperomioides* is a true *Stolzia* possessing all the essential floral characters of the genus and agreeing also in vegetative characters with other members of the genus.

Bulbophyllum (sect. **Megaclinium**) **falcatum** (*Lindl.*) *Rchb. f.* in Walp. Ann. **6,** 258 (1861).

Megaclinium oxyodon Rchb. f. in Gard. Chron. ser. 3, **4,** 91 (1888).

An examination of the type specimen of *Megaclinium oxyodon* in the Reichenbach Herbarium at Vienna, shows that it is conspecific with the

well known *Bulbophyllum falcatum*. It appears therefore that the supposed Madagascan origin of *M. oxyodon* was a mistake by Major Lendy who sent the plant to Reichenbach.

Reichenbach points out two respects in which his species was considered to differ from *B. falcatum*. The short broad and angled pseudobulbs with dark markings, though not found in Sierra Leone material of *B. falcatum*, occur in Nigerian material which is otherwise identical with the type in floral structure. Intermediate types in pseudobulbs also occur.

The epithet "*oxyodon*" was given in allusion to the apices of the column wings which are said to form "sharp introrse teeth" one on each side. Examination shows, however, that these teeth are by no means sharp but are rounded triangular or even semi-ovate, and in this respect do not differ markedly from those found in some specimens of *B. falcatum*. The acuteness or obtuseness is certainly rather variable from one specimen to another in the species. I suspect that Reichenbach saw these lobes from directly in front from which position they would be foreshortened and appear more acute than they really are.

Eulophia angolensis (*Rchb. f.*) *Summerh.*, comb. nov.

Cymbidium angolense Rchb. f. in Flora, **48,** 188 (1865).

Lissochilus angolensis (Rchb. f.) Rchb. f. Otia Bot. Hamburg. 64 (1878); Rolfe in Dyer, Fl. Trop. Afr. **7,** 76 (1897).

Clearly closely allied to *Lissochilus antunesii* Rolfe as indicated in the Flora of Tropical Africa. The material I have seen differs in the shorter and blunter perianth segments and in the shape of the labellum, including the spur. It is possible, however, that all these specimens may prove to be variants of one species.

Eulophia orthoplectra and its allies

The yellow-flowered *Eulophias* with sepals much shorter than the petals form a natural group which has always presented great difficulties to anyone attempting to name a plant belonging to it. The species may be divided conveniently into two sub-groups depending on the length of the spur and the relative positions of the middle and lateral lobes of the labellum. In one sub-group, which includes, among other species, *E. wakefieldii* (Rchb. f. & S. Moore) Summerh. and *E. speciosa* (R. Br.) Bolus, the spur is comparatively short and broadly conical in shape, while the labellum itself is usually more or less pandurate with the lateral lobes not well defined and projecting backwards from their attachment to the column. In the other sub-group, that dealt with here, the spur is drawn out into a distinct narrow or narrowly conical part, which is either more or less straight or curved upwards towards the pedicel. The lateral lobes, which project forward from their attachment to the column, are much more distinct from the middle lobe than in the other group. The middle lobe is usually convex, often very much so, with the sides strongly reflexed.

Eulophia orthoplectra (*Rchb. f.*) *Summerh.* in Kew Bull. **1939,** 499, in obs., sphalm. *orthoplectron.*

Lissochilus orthoplectrus Rchb. f. Otia Bot. Hamburg. 63 (1878).

Eulophia bella N. E. Br. in Gard. Chron. ser. 3, **6,** 210 (1889).

Lissochilus milanjianus Rendle in Trans. Linn. Soc. Lond. ser. 2, Bot. **4,** 46 (1894).

L. monticola Rendle in Journ. Bot. Lond. **33,** 172 (1895), sphalm. *monticolus*.

L. saccatus Rendle, l.c. (1895).

L. kraenzlinii Rolfe in Dyer, Fl. Trop. Afr. **7,** 97 (1897).

L. bellus (N. E. Br.) Schltr. Die Orchid. 343 (1914).

L. pulcher Schltr. in Engl. Bot. Jahrb. **53,** 592 (1915).

In this species the spur is usually almost straight and often with a long narrow point, but sometimes it is even curved slightly downwards away from the pedicel. The keels on the labellum usually consist of three tall ones of which the central is the longest, with one or two lower ones on each side, making 5 or 7 in all. Although usually smooth and often quite narrow they may sometimes be rugulose and broader. The flowers are relatively large, the almost orbicular petals varying from 12–20 mm. in length ; sometimes the petals are appreciably longer than broad whereas in other specimens the breadth may be greater than the length. The sepals are always much shorter than the petals, usually about two-thirds of the petals in length ; they are always markedly reflexed.

E. orthoplectra as here understood has a wide distribution in Tropical Africa from Northern Nigeria eastwards to the Sudan and Kenya Colony and southwards in East Africa to Mozambique and Southern Rhodesia. It is found in the eastern part only of the Belgian Congo and has not been recorded from Angola. The species differs from *E. schweinfurthii* Kraenzl. in the larger flowers and straight spur and in the broader less fleshy leaves.

Eulophia rugulosa *Summerh.*, nom. nov.

Lissochilus mechowii Rchb. f. Otia Bot. Hamburg. 75 (1881).

Owing to the existence of *Eulophia mechowii* (Rchb. f.) Dur. & Schinz, another Angolan species allied to *E. welwitschii* (Rchb. f.) Rolfe, the epithet *mechowii* cannot be used for the present species. I therefore propose the epithet *rugulosa* in allusion to the nature of the keels on the labellum. *E. rugulosa* is evidently closely allied to *E. orthoplectra* (Rchb. f.) Summerh. of which it may prove eventually to be merely a south-western sub-species. It differs in the rather narrower petals, the decurved spur and the keels on the labellum, which are 5–9 in number and all rather low and markedly rugulose.

The species has been found so far in Angola and in the southern part of the Belgian Congo.

Eulophia schweinfurthii *Kraenzl.* in Engl. Bot. Jahrb. **17,** 54 (1893) ; Summerh. in Kew Bull. **1939,** 499.

Lissochilus smithii Rolfe in Dyer, Fl. Trop. Afr. **7,** 96 (1897).

Eulophia pentheri Schltr. in Engl. Bot. Jahrb. **26,** 339 (1899).

Lissochilus elegantulus Schltr. in R. E. Fries, Wiss. Ergebn. Schwed. Rhod.-Kongo-Exped. 1911–12, **1,** 244 (1916).

L. descampsii De Wild. in Bull. Jard. Bot. Brux. **6,** 81, t. XVI, figs. 1–7 (1919).

L. vermiculatus De Wild. l.c. 107, t. XII, fig. 8–11 (1919).

Eulophia involuta Summerh. in Hutch. & Dalz. Fl. West Trop. Afr. **2,** 444 (1936), pro syn. tantum, excl. spec. Afr. occid.

E. compta Summerh. in Kew Bull. **1951,** 472 (1952).

Comparison of the type specimens of all the above concepts, together with a number of other gatherings, shows that they are best treated as variants of one species. The species differs from those already mentioned by the smaller flowers and the upcurved spur which is considerably shorter than in *E. orthoplectra*. The leaves are narrow, very fleshy and V-shaped in section and develop after the flowers. The petals, which are of much the same shape as in *E. orthoplectra*, vary from 8–16 mm. in length but rarely exceed 14 mm. There are 3 rather tall keels on the labellum with one or two lower ones on each side. As in *E. orthoplectra* the lateral sepals are either not at all or only slightly narrowed at the base and have a prominent acumen at the apex. I have pointed out previously (see reference above) that Kraenzlin's description is misleading since he confused the petals with the sepals and reversed the descriptions of these two series of floral leaves.

The species occurs in East Africa from the Sudan southwards through the eastern Belgian Congo and the western parts of Uganda and Tanganyika to Northern and Southern Rhodesia.

Eulophia chrysops *Summerh.*, nom. nov.

Lissochilus aurantiacus Rchb. f. in Flora, **48,** 187 (1865).

L. holubii Rolfe in Dyer, Fl. Trop. Afr. **7,** 96 (1897).

L. johnstonii Rolfe, l.c. 97 (1897).

Examination of the type specimens of the above three concepts shows them to be conspecific. Neither of the epithets can be adopted for the species, however, as they are all already in use in *Eulophia* for quite different species. *E. chrysops* agrees with *E. schweinfurthii* in its comparatively sharp upcurved spur but the flowers are appreciably larger (petals 13–16 mm. long) while the sepals are much less acute and markedly narrowed towards the base, especially the lateral sepals. The middle lobe of the labellum is strongly gibbous with about 5 rather low keels.

The species has a rather scattered distribution occurring in Angola, Bechuanaland and Tanganyika Territory. It is evident that a good deal more collecting is needed to obtain a clearer idea of the true range of the species.

Eulophia juncifolia *Summerh.*, sp. nov. ; affinis *E. schweinfurthii* Kraenzl., a qua foliis quasi junceis carnosis subteretibus marginibus involutis sub anthesi ± evolutis, labelli lobo intermedio marginibus undulatis vel crispulis apice ± incurvato carinis 5 humilibus, lobis lateralibus a columna fere omnino liberis satis differt.—*E. involuta* Summerh. in Hutch. & Dalz. Fl. West Trop. Afr. **2,** 444 (1936), partim, excl. syn.

Herba terrestris, glaberrima, usque ad 1 m. alta ; rhizoma repens, in tuberis irregularibus dilatatum, radices flexuosas griseas emittens. *Caulis* erectus, brevis, usque ad circiter 6 cm. longus, 2–4-foliatus, basi foliorum basibus inclusis usque ad 8 mm. diametro. *Folia* quasi juncea, verosimiliter teretia sed linearia carnosa valde conduplicata, usque ad 65 cm. longa, 3–4 mm. diametro, inferiora latiora et breviora, in cataphyllis abeuntia. *Scapus* e basi caulis exoriens, erectus, usque ad 1 m. altus ; pedunculus teres, vaginis 3–4 dissitis arctis acuminatis instructus, basi 4–7 mm. diametro ; racemus 6–20 cm. longus, sublaxe 6–15-florus ; rhachis teres, interdum leviter fractiflexa ; bracteae ± patentes, acuminatae, usque ad 1 cm. longae, ovario pedicellato breviores. *Flores* erecto-patentes, flavi, petalis subtus rubro-striatis ; pedicellus cum ovario 1–1·7 cm. longus. *Sepalum* intermedium elliptico-oblongum, subspathulatum, apice breviter acuminatum, 7–9 mm. longum, 3–4·5 mm. latum, 5-nervium ; sepala lateralia oblique et late elliptico-oblonga vel oblonga, apice breviter acuminata, 6–9 mm. longa, 3·5–5 mm. lata, septemnervia ; omnia sepala valde reflexa. *Petala* ± horizontalia, late ovato-orbicularia vel orbicularia, apice apiculata vel breviter acuminata, 11–14·5 mm. longa, 10·5–14·5 mm. lata, multinervia nervis anastomosantibus, supra pallide flava, subtus rubro-striata vel rubro-venosa. *Labellum* horizontale, trilobatum, deorsum conico-calcaratum, in toto 12·5–17·5 mm. longum ; lobus intermedius ovatus vel late lanceolatus, apice ± incurvatus subacutus, medio convexus vel gibbosus, marginibus crispulis recurvatis, 7·5–12 mm. longus, 6–8·5 mm. latus, carinis vel cristis 5 humilibus 3 centralibus longioribus instructus ; lobi laterales erecti, oblongi vel semi-elliptici, apice rotundati, postice inferne cum columna et columnae pede adnati, 5–7 mm. longi, ab intermedio sinu lato rotundato sejuncti ; calcar late conicum, apice saepius angustatum recurvatum, columnae pede incluso 4·5–7·5 mm. longum. *Columna* porrecta, semi-teres, apice truncata, 4·5–7 mm. longa, androclinio leviter excavato ; anthera postice hemisphaerica bigibbosa, antice in appendicem anguste triangularem acutam producta ; pollinia 2, ellipsoidea, stipite late ligulato polliniis breviore, viscidio pentagono vel quadrato.

PORTUGUESE GUINEA. Farim, Cajambarim, in meadows on damp marshy soil, Oct. 1946, *Sousa in Espirito Santo* 2317.

GHANA. Anum Plains, Aug. 1905, *Johnson* 1094 (type) ; Attabubu, in grass plains, Aug. 1942, *Cox* 110 ; Ejura, wet places in savanna forest, Aug. 1947, *Andoh* 5047 ; same locality, Sept. 1954, *Westwood* 16A ; Togo, Kpandu-Golokuati road, July 1952, *Westwood* 16.

In my account for the Flora of West Tropical Africa (see reference above) I identified some of the specimens cited above with the East African *Lissochilus smithii* Rolfe which I renamed *Eulophia involuta* on transference to that genus. With further material available from both West and East Africa it is evident that two distinct species are concerned and I am consequently describing the West African species herewith. *E. involuta* itself is now found to be conspecific with the older *E. schweinfurthii* Kraenzl., as I have indicated earlier in this account.

The present species is characterised by the very narrow rush-like leaves. These are not actually terete but are very fleshy and so closely conduplicate that the two sides almost meet to produce a terete appearance. The leaves appear soon after the scape and are therefore well expanded

before the flowers go over, whereas in the East African members of this alliance the leaves are never fully expanded at anthesis. In fact in many cases no sign can be seen of them at that period. The middle lobe of the labellum is thinner in texture than in *E. schweinfurthii*, much crisped at the margins and often more or less incurved at the apex.

Eulophia hirschbergii *Summerh.*, sp. nov. ; affinis *E. schweinfurthii* Kraenzl., a qua foliis multo angustioribus, labelli calcari tenuiore, cristis in papillis vel dentibus solutis, columnae pede brevissimo satis distinguitur.

Herba terrestris, 20–40 cm. alta, glaberrima ; tubera ovoidea, flavida, siccitate rugulosa, 2–3 cm. longa, radices griseas vel albidas 2–4 mm. diametro emittentia. *Caulis* erectus, brevis, circiter 3–5 cm. altus, 1–2-foliatus, basi vaginis paucis vestitus. *Folia* erecta, inferius breve, fere ad vaginam redactum, usque ad 7 cm. longum, superius fere teres faciei superiore late canaliculatum, carnosum, 20–25 cm. longum, 2–4 mm. diametro, apice subulatim angustatum acutum. *Scapus* erectus, gracilis, usque ad 40 cm. altus, superne simpliciter racemosus ; pedunculus teres, vaginis ± arctis subacutis instructus, 13–33 cm. longus, basi circiter 2–3 mm. diametro ; rhachis levissime flexuosa vel recta, 4–11 cm. longa, sublaxe 5–12-flora ; bracteae erecto-patentes vel suberectae, anguste lanceolatae, acutae vel acuminatae, usque ad 8 mm. longae, pedicello cum ovario breviores. *Flores* arcuatim patentes ; pedicellus cum ovario arcuatus, circiter 1 cm. longus. *Sepalum* intermedium oblanceolatum, apice apiculatum, 4·7–6·3 mm. longum, 2–3·5 mm. latum ; sepala lateralia oblique elliptico-oblongum, apice apiculatum, 5–6 mm. longum, 2–3·5 mm. latum ; omnia sepala ± reflexa vel recurvata, viridi-brunnea, subquinquenervia. *Petala* quam sepala multo majora, patentia, late elliptica vel fere orbicularia, 7·5–10·5 mm. longa, 6 8 mm. lata, multinervia nervis anastomosantibus, subtus rubro-striata. *Labellum* distincte trilobatum, in toto (ab apice calcaris usque ad apicem lobi intermedii) 11–16 mm. longum, flavum, lobo intermedio apice roseo vel rubro-brunneo ; lobus intermedius oblongus, apice sub-acutus vel obtusus, 5·5–8 mm. longus, 1·5 4·5 mm. latus, convexus, cristis 5 longitudinalibus in papillis vel dentibus irregularibus solutis, utrinque crista multo humiliore rugulosa addita instructus ; lobi laterales erecti, elliptici, margine posteriore inferne cum columna adnati, apice rotundati, margine anteriore 2–3 mm. longi ; calcar rectum vel leviter curvatum, e basi latiore anguste conicum vel cylindricum, 3·5–5·5 mm. longum. *Columna* crassa, 2·2–3·7 mm. longa, pede brevissimo ; androclinium leviter excavatum. *Anthera* fere hemisphaerica, antice breviter producta ; pollinia ovoidea, circiter 1 mm. longa, stipite lineari circiter 1 mm. longo, viscidio parvo elliptico.

Belgian Congo. Katanga, near Elisabethville, in very wet marsh, March 1924, *Von Hirschberg* 188 (type) ; Katuba, Droogmans' Farm, May 1927, *Quarré* 493.

Northern Rhodesia. Abercorn Distr., Pans near Abercorn, 1500 m. alt., in very wet ground, Feb. 1952, *Richards* 1087.

Eulophia ramifera *Summerh.*, nom. nov.

E. elliotii Rolfe in Dyer, Fl. Trop. Afr. **7,** 54 (1897), non Rolfe (1891).

Owing to the existence of *E. elliotii* Rolfe (1891), a Madagascan species, this epithet cannot be used for the West African plant. I therefore

propose the epithet *ramifera* in allusion to the branched inflorescence. The species is known from Senegal, Sierra Leone and Northern Nigeria and probably occurs in the intervening areas.

Eulophia stenoplectra *Summerh.*, sp. nov. ; affinis *E. clitelliferae* (Rchb. f.) Bolus, a qua statura majore, labelli lobis lateralibus angustioribus semi-ellipticis, calcari longiore et graciliore satis differt.

Herba terrestris, 35–45 cm. alta, glaberrima ; tubera et caulis foliosus non visa. *Scapus* erectus, basi vaginis circiter 4 sublaxis lanceolatis acuminatis usque ad 2·6 cm. longis marginibus purpureis vestitus, superne laxiuscule multiflorus, basi usque ad 3 mm. diametro ; pedunculus teres, 15–24 cm. longus, cataphyllis paucis dissitis lanceolatis acuminatis instructus ; rhachis leviter fractiflexa, 20–27 cm. longa, teres ; bracteae patentes vel ± reflexae, anguste lanceolatae, usque ad 1 cm. longae, ovario pedicellato multo breviores. *Flores* adscendentes, patentes vel dependentes, viridi-brunnei vel rubri, cum labello flavo ; pedicellus (cum ovario) 1–1·5 cm. longus, gracilis. *Sepalum* intermedium oblongo- vel ligulato-oblanceolatum, apice subacutum vel apiculatum, 6·5–8 mm. longum, 2·5–4 mm. latum ; sepala lateralia oblique ligulato-oblanceolata, apice acutiuscula, 6·5–8·5 mm. longa, 2–3 mm. lata ; omnia sepala 3–5-nervia. *Petala* oblique ovata vel late ovata, apice obtusa vel leviter retusa, 7–9 mm. longa, 4·5–8 mm. lata, multinervia, nervis exterioribus valde ramosis. *Labellum* distincte trilobatum, in toto (ab apice calcaris usque ad apicem lobi intermedii) 10·5–16·5 mm. longum ; lobus intermedius ellipticus, apice rotundatus, medio convexus, marginibus undulatis ± incurvatis, 4–6 mm. longus, 3·5–5 mm. latus, cristis 5–7 humilibus verrucosis instructus ; lobi laterales erecti, columna adpressi et eius basi connati, semi-elliptici, rotundati, 2·5–3·5 mm. longi, 2–2·5 mm. lati, plurinervii ; calcar saepius ± incurvatum, e basi lata conica anguste cylindricum, in toto 5·5–8 mm. longum. *Columna* crassa, semi-teres, 2·7–3·5 mm. longa, apice truncata ; androclinium leviter excavatum ; pollinia ovoidea, 1·5 mm. longa, stipite ligulato apice triangulari 0·8 mm. longo, viscidio transverse elliptico 0·6 mm. lato.

Ghana. N.E. Ashanti, Afram Plains, Feb. 1936, *Cansdale* 5 ; 12.

Sudan. Equatoria Prov., between Mts. Könyi and Loka, on recent burn, Feb. 1938, *Myers* 8474 (type).

Uganda. Teso Prov., Serere, 1080 m. alt., appearing after grass fires, Feb. 1933, *Chandler* 1085.

This species is clearly referable to the group containing *E. clitellifera* (Rchb. f.) Bolus and *E. pyrophila* (Rchb. f.) Summerh. in which the sepals are almost the same length as the petals though considerably narrower. It is characterised by the long very slender spur, which gives it the same appearance as small flowered plants of *E. orthoplectra* (Rchb. f.) Summerh. in which, however, there is a marked disparity in the lengths of the sepals and petals. The scape, which is the only part known to me, is tall and relatively slender with up to 25 flowers. Whether the leaves develop some time after the flowers or whether they do not develop at all, as is the case with a number of other African species of *Eulophia*, has yet to be discovered.

I had previously determined the two eastern specimens cited above as

E. clitellifera but on further examination they are seen to differ from that species by the characters given in the diagnosis.

Pteroglossaspis distans *Summerh.*, sp. nov. ; ab aliis speciebus floribus non resupinatis, columna longiore satis differt.

Herba terrestris, erecta, usque ad 85 cm. alta, glaberrima ; tubera 2·5–4 cm. longa, irregulariter palmatim vel pinnatim lobata, horizontaliter applanata, vaginis subscariosis ± vestita, rugosa, siccitate flavida. *Folia* singula vel gemina, ex apice tuberis lobi exorientia, lineari-lanceolata, longe petiolata, in toto 35–70 cm. longa, 6–18 mm. lata, apice acuta, textura tenuia, subtus nervis tribus prominentibus ; petiolus 10–20 cm. longus, canaliculatus, cataphyllis vaginantibus scariosis fere omnino obtectus. *Scapus* lateraliter exoriens, erectus, usque ad 85 cm. altus ; pedunculus teres, per totam longitudinem vaginis scariosis arctis indutus, basi 3–4 mm. diametro ; rhachis 7–9 cm. longa, teres, subdense multiflora ; bracteae lanceolato-lineares, acutissimae, usque ad 5 cm. longae et 3 mm. latae, flores valde superantes, scariosae. *Flores* non resupinati, suberecti, virides et purpurei, fragrantes ; pedicellus cum ovario 4–6 mm. longus. *Sepalum* intermedium oblongo-oblanceolatum, apice breviter acuminatum, 10–11 mm. longum, circiter 3·5 mm. latum ; sepala lateralia leviter oblique oblongo-lanceolata, apice apiculato-acuminata, circiter 9·5 mm. longa, fere 4 mm. lata. *Petala* oblique oblongo-elliptica, apice apiculata, circiter 10 mm. longa et 4 mm. lata, prope apicem denticulata ; omnia tepala haud patentia, plurinervia, nervis ± anastomosantibus, viridia vel pallide viridia. *Labellum* ecalcaratum, vix patens, dimidio inferiore trilobatum, 9–10 mm. longum, quo latissimum 6–8 mm. latum, crassum, carnosum, nigro-purpureum ; lobi laterales patentes, ± late triangulares, subacuti, margine anteriore 2–2·5 mm. longi, ecallosi; lobus intermedius quam lateralibus multo major, oblongus vel quadratus, apice leviter emarginatus, 5–5·5 mm. longus, 3–4 mm. latus, antice marginibus crenulatis, cristis pluribus parallelis fere adiacentibus valde rugulosis vel verrucosis instructus. *Columna* apoda, leviter incurvata, sectio semi-teres, rubro-purpurea, apice dilatata, basi leviter excavata utrinque auricula rotundata nigro-purpurea instructa, 4·5–6 mm. alta, androclinio reclinato leviter excavato ; anthera hemisphaerica, apice leviter umbonata, circiter 1·5 mm. alta, antice ± truncata ; pollinia 2, applanato-sphaerica, stipite rotundato-deltoideo 0·6–0·7 mm. longo, viscidio transverse anguste rhomboideo plus 2 mm. lato ; fovea stigmatica transverse elliptica. *Capsulae* non visae.

Sierra Leone. Bonthe Distr., Taigbe, near Bendu, in grassland on poor very sandy soil, Oct. 1946, *Adames* 92 (type) ; same locality, Oct. 1951, *Jordan* 620.

This remarkable species seems best placed in the genus *Pteroglossaspis* though in some respects it differs from the other members of the genus, hence the specific epithet. In general habit, tubers, leaf arrangement and shape, and the characters of the inflorescence, particularly the sheaths enveloping the whole of the peduncle and the long bracts, it agrees well with other species of *Pteroglossaspis*. The flowers, however, are not resupinate, the labellum occupying an adaxial position. The column is without a foot but is longer and more slender than usual ; at the base it is furnished on each side with a rounded auricle. The labellum, as in other species of the genus, is without a spur, is trilobed in the

lower part, rather fleshy, and darker in colour than the perianth. The large middle lobe is almost completely covered with a series of parallel verrucose crests lying close to one another. Such verrucose thickenings, though to a less extent, are found on the labellum of other species of *Pteroglossaspis*.

P. distans is an interesting addition to the genus on account of its distribution. At present *Pteroglossaspis* is represented by five species in eastern Africa, one in Florida and another in the Argentine. The new species therefore occurs in a locality more or less midway between the other areas of occurrence of the genus. It is at present known from only one locality but it is probable that it occurs elsewhere in suitable places along the coastal region of Sierra Leone and also in the neighbouring countries.

Calyptrochilum christyanum (*Rchb. f.*) *Summerh.* in Hutch. & Dalz. Fl. West Trop. Afr. **2,** 450 (1936) et in Kew Bull. **1948,** 277.

Angraecum christyanum Rchb. f. in Gard. Chron. ser. 2, **13,** 806 (1880).

A. schoellerianum Kraenzl. apud Schweinf. in Bull. Herb. Boiss. **2,** app. II, 112 (1894).

A. malangeanum Kraenzl. in Engl. Bot. Jahrb. **22,** 26 (1895).

A. moloneyi Rolfe in Dyer, Fl. Trop. Afr. **7,** 145 (1897).

A. mombasense Rolfe, l.c. (1897).

A. zigzag De Wild. Not. Pl. Utiles Congo, **1,** 143 (1903).

A. pynaertii De Wild., l.c. **2,** 160 (1906).

A. ovalifolium De Wild., l.c. 161 (1906).

Rhaphidorhynchus moloneyi (Rolfe) Finet in Mém. Soc. Bot. France, **9,** 41 (1907).

Angraecum marsupio-calcaratum Kraenzl. in Engl. Bot. Jahrb. **51,** 397 (1914).

Calyptrochilum orientale Schltr. in Engl. Bot. Jahrb. **53,** 595 (1915).

C. moloneyi (Rolfe) Schltr., l.c. (1915), in obs.

C. mombasense (Rolfe) Schltr., l.c. (1915), in obs.

C. schoellerianum (Kraenzl.) Schltr., l.c. (1915), in obs.

Angraecum bokoyense De Wild. in Bull. Jard. Bot. Brux. **5,** 182 (1916).

Calyptrochilum bokoyense (De Wild.) Schltr. in Beih. Bot. Centralbl. **36,** ii, 84 (1918).

C. malangeanum (Kraenzl.) Schltr., l.c. (1918).

C. marsupio-calcaratum (Kraenzl.) Schltr., l.c. (1918).

C. ovalifolium (De Wild.) Schltr., l.c. 85 (1918).

C. pynaertii (De Wild.) Schltr., l.c. (1918).

C. zigzag (De Wild.) Schltr., l.c. (1918).

On careful examination of type specimens and/or descriptions of the above concepts there seems little doubt that they are referable to one species which must bear the earliest epithet *christyanum*. The species is certainly very variable in its vegetative parts, on differences in which

many of the above concepts have been founded, but the floral characters remain relatively constant throughout. The most characteristic feature is the spur of the labellum. This is gradually narrowed from a wide mouth to form a sort of rather oblique extinguisher or helmet-shaped sac which terminates in a rounded apex. Just below the apex, on the side away from the rhachis, and attached at nearly a right angle to this basal portion, is a much shorter appendix shaped very much like the teat on a baby's feeding bottle, that is, gradually widened from the base to a wide rounded apex. I am not acquainted with any other Angraecoid orchid in which there are two such sharply defined parts of the spur.

The leaves vary in relative length and breadth, in the sharpness or bluntness of the apical lobes and in the degree of parallelism of the sides, but all intermediates can be found between the various concepts based on these characters, sometimes even on the same plant ! As regards the inflorescence this is always short with a more or less zigzag rhachis, the bracts and flowers being borne on the outer angles ; the amount of bending and the size of the bracts varies from plant to plant. The flowers are larger in some plants than in others but in all those I have examined the intermediate sepal is between 5·5 and 8·5 mm. in length, lengths between 6 and 7 mm. being most frequent.

I have not seen the type specimens of *Angraecum schoellerianum*, *A. malangeanum* or *A. marsupio-calcaratum*, but from reading the descriptions it is clear that they are all synonymous with *A. christyanum*. In two cases Kraenzlin especially draws attention to the remarkable spur already described above, while in the other the formal description of the spur evidently agrees with that in *A. christyanum*. In other respects all these species agree admirably.

As understood here the species has a wide distribution in Tropical Africa from Gambia eastwards to the Sudan, Eritrea and Uganda and southwards through the Belgian Congo to Angola, and the Rhodesias. I have no actual records from Kenya, the greater part of Tanganyika or from Nyasaland, but the species occurs in the Tukuyu district of Tanganyika. *A. mombasense* Rolfe is based on a specimen labelled "Mombasa" but the species has not been found anywhere near this place and it is probable that the specimen came from somewhere inland.

I am quite unable to understand on what grounds Roberty reduces this species to its congener *C. emarginatum* (Sw.) Schltr. Except for a small number of *completely sterile* plants or specimens in which the leaves approach one another in size, the two species can be distinguished from one another at a glance especially if the remains only of an inflorescence are visible. In all inflorescence and floral characters the species are markedly different, though clearly referable to the same genus, and I have seen no intermediates whatever.

Angraecum (sect. **Conchoglossum**) **modicum** *Summerh.*, sp. nov. ; affine *A. angusto* (Rolfe) Summerh., a quo foliis angustioribus, inflorescentiae floribus paucioribus, tepalis latioribus, labello supra basin haud constricto, calcari breviore dimidio basali minus inflato.

Herba epiphytica, omnino glaberrima. *Caulis* elongatus, simplex vel pauciramosus, usque ad 15 cm. longus, fere per totam longitudinem

foliatus, applanatus, 2–3 mm. diametro, vaginis foliorum vel foliorum delapsorum fere omnino obtectus, inferne radices aërias flexuosas laeves griseas emittens. *Folia* disticha, erecto-patentia; vagina arcta, 5–7 mm. longa, longitudinaliter rugulosa; lamina anguste vel lineari-lanceolata, apice inaequaliter acute bilobata, lobo longiore usque ad 7 mm. longo, lobo breviore usque ad 1 mm. longo vel fere nullo, tota usque ad 7·5 cm. longa et 8 mm. lata, tenuiter coriacea, nervo subtus prominulo, marginibus saepius leviter recurvatis. *Inflorescentia* ut videtur folio opposita sed revera in axilla folio superiore exoriens et per vaginam ejus erumpens, adscendens vel fere patens, 3-flora, usque ad 5 cm. longa; pedunculus gracilis, basi vaginis duabus instructus, 7–25 mm. longus; rhachis ± fractiflexa, gracilis; bracteae e basi vaginante lanceolatae, acutae, 3–5 mm. longae, ovario pedicellato multo breviores. *Flores* patentes, incarnati; pedicellus cum ovario filiformis, 1–1·5 cm. longus. *Sepalum* intermedium anguste lanceolatum, apice subacutum, 19–23 mm. longum, circiter 3 mm. latum; sepala lateralia oblique anguste lanceolata, apice subacuta, 18–19 mm. longa, 2·5–3 mm. lata; omnia sepala 5-nervia. *Petala* oblique lanceolato-linearia, apice acuta, 16·5–18 mm. longa, circiter 1 mm. lata, trinervia; omnia tepala patentia. *Labellum* porrectum, e basi concava columnam ± amplectente lanceolatum, apice acutissimum, 15 mm. longum, 3–3·5 mm. latum, sub-septemnervium; calcar fere rectum vel leviter inflexum, basi anguste conicum, medio leviter constrictum, dimidio apicali modice inflatum apice ipso rotundatum, circiter 14 mm. longum, parte apicali circiter 1 mm. diametro. *Columna* brevis, crassa, apice ± truncata, circiter 1·75 mm. longa; androclinium leviter reclinatum; anthera ± hemisphaerica, obscure 2-lobulata, antice truncata leviter emarginata; pollinia ovoidea, 0·8 mm. longa, stipitibus duobus ligulatis, viscidiis duobus elliptico-oblongis polliniis aequilongis; rostellum deflexim porrectum, profunde incisum, lobis rotundatis.

LIBERIA. Ganta, May 1953, *Harley* 1923; May 1955, *Harley* 2131 (type).

This species is clearly near *A. angustum* (Rolfe) Summerh. which is known from Calabar in Southern Nigeria only. It differs in the leaves, the fewer-flowered inflorescences and particularly in the characters of the labellum. In *A. angustum* the labellum is much narrowed a little way above the base and then suddenly widened so that the front part is nearly cordate; the spur is also much inflated beneath in the basal part and suddenly narrows to the central constricted region. In *A. modicum*, on the other hand, there is no constriction in the blade of the labellum which is narrowed gradually to the apex, while the basal part of the spur narrows regularly in the form of a narrow cone from the attachment to the central constriction.

After consideration of the various species concerned I have decided to include this species in sect. *Conchoglossum* which I am extending in concept to include species with few-flowered (up to 4-flowered) inflorescences. Schlechter originally included *A. multinominatum* Rendle, which usually possesses several-flowered inflorescences, and I cannot see where a line can be drawn between species such as *A. multinominatum*, *A. angustum* and *A. modicum*, on the one hand, and other species, such as *A. chevalieri* Summerh., *A. angustipetalum* Rolfe and *A. viride* Kraenzl., in which the

inflorescences are usually, but not invariably, 1-flowered. In some of the above species, conjoined with a constant leaf and flower structure, the inflorescence may be consistently 1-flowered in one gathering, while in another gathering each inflorescence bears 2–3 flowers.

I fail to see how Schlechter's concept of sect. *Conchoglossum* differs from his later concept (and also Perrier's) of sect. *Baroniangraecum*. Perrier's concept of sect. *Hildebrandtiangraecum* seems to me to consist of some species (e.g. *A. curvicaule* Schltr.) which are better placed in sect. *Conchoglossum* and others which do not seem to be very closely allied to these and which may well be treated as a separate section, such as *A. musculiferum* H. Perrier, *A. poöphyllum* Summerh. (*A. graminifolium* (Ridl.) Schltr.) and probably others.

Chamaeangis (sect. **Chamaeangis**) **gabonensis** *Summerh.*, sp. nov. ; a *C. vesicata* (Lindl.) Schltr. labello oblongo apice obscure trilobulato, calcari apice clavato haud breviter vesiculoso, a *C. ichneumonea* (Lindl.) Schltr. foliis angustioribus, floribus geminis vel ternis minoribus satis distinguitur.

Herba epiphytica, radicibus exceptis glaberrima ; caulis brevis, usque ad 9 cm. longus, inferne vaginis foliorum delapsorum ± obtectus, radices numerosas ramosas griseas vel griseo-brunneas saepius velutinas emittens, superne crebre foliatus, circiter 0·5 cm. diametro. *Folia* pendentia, ± incurvata vel conniventia ; vagina brevis, circiter 1 cm. longa, pluricostulata ; lamina linearis vel lineari-ligulata, apice acuta, basi leviter angustata, usque ad 60 cm. longa et 1·3 cm. lata, carnosa, marginibus ± incurvatis, lamina supra ± late canaliculata vel concava. *Inflorescentia* ex axillis foliorum vel foliorum delapsorum exoriens, singula, pendens, simpliciter racemosa, usque ad 25 cm. longa, multiflora ; pedunculus teres, 3–8 cm. longus, circiter 1–2 mm. diametro, vaginis annulatis brevibus obtusis instructus ; rhachis peduncul similis ; bracteae oppositae vel ternae, in annulum coalitae, breves, vix 2 mm. longae. *Flores* gemini vel terni, patentes, flavidi ; pedicellus cum ovario circiter 4 mm. longus. *Sepalum* intermedium patens vel fere recurvatum, ovatum, apice subulato-acuminatum, circiter 3·5 mm. longum, fere 2 mm. latum ; sepala lateralia patentia, oblique oblongo-ovatum, apice acuminatum, circiter 4 mm. longum, fere 2 mm. latum ; omnia sepala trinervia, carnosula. *Petala* patentia, triangulari-lanceolata, acuta, 2·5–3 mm. longa, circiter 1·25 mm. lata, trinervia. *Labellum* porrectum vel deflexum, oblongum, apice obscure trilobulatum, lobulo intermedio recurvato, lobulis lateralibus rotundatis, fere 3 mm. longum, circiter 1·75 mm. latum, plurinervium, basi cum columna breviter adnatum ; calcar incurvatum, dimidio inferiore anguste cylindricum, dimidio apicali clavato-inflatum, apice ipso angustatum, circiter 14 mm. longum, 1·25 mm. diametro. *Columna* brevis, crassa, androclinio leviter excavato ; anthera et pollinia non visa.

Gabon. Djoua River basin, banks of Liboumba River at Kemboma, Oct. 1932, *Le Testu* 8952.

This is a typical member of the genus and evidently allied to *E. vesicata* (Lindl.) Schltr. with which it shares the rather narrow acute fleshy leaves and flowers in twos or threes at each node of the inflorescence. The

leaves are, however, narrower even than in *C. vesicata* and seem to be more fleshy. The edges are incurved so as to produce a concave upper surface. The labellum is oblong with an obtuse, almost 3-lobed apex, the middle lobe or apiculus being recurved so that from some points of view the apex appears emarginate. The spur, instead of being expanded abruptly into an almost spherical apical vesicle is more gradually inflated in the distal half and in this respect is much more like *C. ichneumonea* (Lindl.) Schltr. This latter species, however, has much broader leaves, larger flowers always borne singly and the spur swelling more pronounced.

Cyrtorchis (sect. **Homocolleticon**) **ringens** (*Rchb. f.*) *Summerh.*, comb. nov.

Listrostachys ringens Rchb. f. in Gard. Chron. ser. 2, **10,** 266 (1878).

Angraecum bistortum Rolfe in Kew Bull. **1893,** 65.

Listrostachys hookeri Rolfe in Dyer, Fl. Trop. Afr. **7,** 154 (1897).

L. bistorta (Rolfe) Rolfe, l.c. 155 (1897).

L. ignoti Kraenzl. in Engl. Bot. Jahrb. **51,** 395 (1914).

Cyrtorchis bistorta (Rolfe) Schltr. in Beih. Bot. Centralbl. **36,** ii. 129 (1918).

C. hookeri (Rolfe) Schltr. l.c. 131 (1918).

On examination of the type specimen of *Listrostachys ringens* Rchb. f. in the Reichenbach Herbarium it is evident that it is conspecific with the species known previously as *Cyrtorchis bistorta* (Rolfe) Schltr. The epithet *ringens*, which has 15 years priority over *bistorta*, has therefore to be adopted for this plant.

Schlechter did not account for *L. ringens* in his revision of the Angraecoid Orchids (Beih. Bot. Centralbl. **36,** ii. 62-181 : 1918) possibly on account of Reichenbach's misleading remarks about the rostellum in his species. The latter states that *L. ringens* is intermediate in structure between *L. arcuata*, *L. chailluana* and *L. sedenii* (all now referred to the typical section of *Cyrtorchis*) and what he erroneously names *L. filicornis*, which is presumably *Mystacidium filicorne*, the type species of the genus *Mystacidium*. He bases this opinion on the supposed absence of a beaked rostellum in *L. ringens*, but examination of a flower from the type specimen shows that the column has a long beak-like rostellum about 3 times as long as itself, similar to that in other species of *Cyrtorchis*. It appears that Reichenbach must have broken off the beak, which is placed within the spur and easily broken, when he examined the flower.

The species extends from Sierra Leone in the west to the French Cameroons in the east and occurs also in São Tomé.

Nomenclatural Notes: V*

A. A. Bullock

On the typification of the generic name Notopleura (Rubiaceae)

The generic name *Notopleura* was first used as a sectional epithet by Bentham (1852) under *Psychotria* Linn. and was accepted in the same sense by Hooker (1873), who contributed the account of *Rubiaceae* in the *Genera Plantarum*. The section was based upon *Psychotria hartwegii* Bentham (1852), a legitimate new name for *Coffea marginata* Bentham** (1845), but Bentham included in it also *Psychotria laevis* DC. (1830) and Hooker (1873) added *P. uliginosa* Swartz (1788).

In 1934 the section was given generic rank by Bremekamp, who stated that the type of the generic name is *Notopleura uliginosa* (Swartz) Bremekamp (*Psychotria uliginosa* Swartz). The generic name, however, is based upon "*Psychotria* sect. *Notopleura* Bentham et Hooker f." and its type species must, under the provisions of App. IV of the Code, be the species originally cited as type of the sectional epithet. Bremekamp, unfortunately, cited Bentham and Hooker as authors of the sectional epithet, and did not anywhere refer to Bentham's earlier description, or to *Psychotria hartwegii* as a member of it. Hooker, however, clearly referred to Bentham's description and included *Psychotria hartwegii*, Bentham's holotype species, in the section. There was no specific exclusion of the type by Bremekamp, and it must be assumed that his failure to mention it was an oversight. The citation of the sectional epithet must here be regarded as of paramount importance.

For the purposes of *Index Nominum Genericorum*, the generic name *Notopleura* and its type species may be cited as follows :—

Notopleura (*Bentham*) *Bremekamp*, Rec. Trav. Bot. Néerl. 31 : 289. 1934.

Psychotria sect. *Notopleura* Bentham, Vidensk. Meddel. Nat. For. Copenhagen, 1852 (2–4) : 37. 1852; Hooker f. in Bentham et Hooker f., Gen. Pl. 2: 124. 1873.

N. marginata (*Bentham*) *Bullock*, comb. nov. holotypus nominis generici.

Coffea marginata Bentham, Pl. Hartweg. 93. 1845.

Psychotria hartwegii Bentham, Vidensk. Meddel. Nat. For. Copenhagen, 1852 (2–4): 37. 1852; non *P. marginata* Swartz, Prodr. Descr. Veg. Ind. Occ. 43. 1788.

---

* Continued from Kew Bull. 1958: 52. 1958.
** Non *Psychotria marginata* Swartz, 1788.

Recent researches on the botany of Juan Fernandez and Easter Island

W. B. Turrill

In the Kew Bulletin 1919, pp. 268–79, the writer attempted to summarize the important work of Prof. Dr. C. Skottsberg on the floras and vegetation of parts of temperate and subtropical South America and Easter Island. Recently there has appeared three volumes under the title "The Natural History of Juan Fernandez and Easter Island" edited by Prof. Skottsberg. This work* includes and brings up to date the researches on these islands initiated and largely carried out by Prof. Skottsberg. Three papers by him deserve the full attention of botanists, whether they are interested as specialists in the biology of these Pacific Islands or whether they are phytogeographers with a wider outlook on the problems of plant ranges and distribution. These papers are well produced, with numerous excellent and instructive photographic illustrations, and full of valuable matter, both factual and critically speculative. An outline of their contents is here given in the hope that many will be encouraged to consult the originals.

A geographical sketch of the Juan Fernandez Islands.

The islands are of volcanic origin and are considered to be late Tertiary. The earlier geographical studies are summarized. Details of various volcanic rocks are given but it is clearly stated that no extensive geological survey has been made of the islands. The text and the illustrations show how mountainous is the terrain though there are considerable differences both in geology and morphology between the main islands of Masatierra and Masafuera.

An account of the human influence on Juan Fernandez, discovered in 1563, 1572, or 1574, as virgin and uninhabited islands, has considerable botanical importance. The human immigrant population has fluctuated, as also have the attempts at arable farming and stock raising. Destruction of the native vegetation, and especially of the forests, has gone on continuously. The economically valuable sandal wood (*Santalum fernandezianum* F. Phil.) has been exterminated. Cutting of timber and the ravages of introduced herbivores, above all of goats, have done irreparable damage to a flora and vegetation that had so many unique features. Fishing (especially for lobsters) is the main source of income for the inhabitants. The islands were declared a National Park in 1935, but, in Prof. Skottsberg's words, "a law has little effect without means to enforce it", and he makes it clear that at the time of writing neither money nor men with authority were provided for a conservation programme, that is for a conservation of what is left of the indigenous flora and fauna. He sums up by saying "If the responsible authorities do not change their attitude, Juan Fernandez will become a second Saint Helena and a disgrace to an enlightened world".

* The Natural History of Juan Fernandez and Easter Island, edited by Carl Skottsberg, Uppsala, 1920–1956, 3 volumes.

The vegetation of the Juan Fernandez Islands.

Knowledge of the climate of Juan Fernandez is very incomplete. The rainfall is heavier in the highlands than near the coast and dense fog frequently covers the mountains above 400–500 m. The winds are mainly from S. to W. For the lower region on the north side of central Masatierra (for 1901-7) the mean annual temperature is given as 15°·6 C., means of daily maximum and minimum 18°·8 and 13°·5, and the average rainfall 1081 mm.

The life forms of 146 species were determined on the Raunkiaer system and compared with a normal spectrum based on 1000 species. The tabulated results for indigenous species include the following:

	No. of species	Life forms in % of total number of species.									Ph (S–N)
		S	E	MM	M	N	Ch	H	G	HH	Th	
Juan Fernandez	146	—	0·7	6·8	16·4	24	25·3	22	—	1·4	3·4	48
Masatierra ...	100	—	1	8	21	25	17	22	—	2	4	55
Masafuera ...	73	—	—	6·8	5·5	20·5	37	26	—	—	4·1	33
Normal spectrum	1000	2	3	8	18	15	9	26	4	2	13	46

Striking facts in this table are the high figures in Juan Fernandez for phanerophytes, the low figures for therophytes, and hydrohelophytes, and the absence of succulents and geophytes. The figures are compared with those for Madeira and the Canaries and when the adventitious species recorded for Juan Fernandez are included with the indigenous ones there is an approach in the spectra. It is the endemic element that puts its stamp on the spectrum of the native flora.

A chapter deals with morphological and biological features of the vascular plants. The dominant trees of Masatierra are *Nothomyrcia fernandeziana*, *Drimys confertiflora*, and *Fagara mayu*, and of Masafuera *Myrceugenia schulzei* and *Drimys*. Second to these, but common on both islands, comes *Coprosma pyrifolia*. Descriptions of these and the other vascular plants are given and are obviously based on close study of living plants. Much could be quoted from these descriptions which should be consulted by taxonomists preparing monographs of the genera and families involved. Valuable black and white figures and photographs illustrate the text.

The vegetation is considered separately for Masatierra and Masafuera. No climatic upper timber line exists in the former. The forests of Juan Fernandez have physiognomically much in common with the laurinaceous forests of the Macronesian islands and with the *Metrosideros* forest in the Hawaiian islands, but also contains many elements linking them to the Valdivian rain forest in south Chile, from which they differ by the total absence of *Nothofagus* as well as woody climbers.

In Masatierra the following communities are recognized:

Lower Montane Forest, with sociations of *Nothomyrcia* (with other plants) and *Boehmeria*.

Upper Montane Forest, with sociations of *Drimys-Nothomyrcia*, etc.

Brushwood along the foot of precipices and on rock ledges, with sociations based on *Drimys*, *Nothomyrcia*, *Blechnum*, and other plants.

Brushwood and scrub on exposed ridges, with sociations including *Pernettya*, *Escallonia*, *Gunnera*, *Ugni*, and others, including cryptogams.

Vegetation of streams and cascades, including sociations with *Gunnera*, *Cardamine*, etc.

Grasslands with *Stipa laevissima* sociation and dwarf scrub-grassland complex.

Waste lands on the north side of Masatierra, with degraded grasslands and weeds.

Vegetation of the sea shore, including *Lobelia alata* colony, lichen community, and *Selicornia peruviana* sociation.

In Masafuera there is a timber line above which is a series of heath communities lacking in Masatierra. The communities recorded are:

Lower Montane Forest with sociations including *Myrceugenia*, *Coprosma*, and *Fagara*.

Upper Montane Forest, especially characterized by *Dicksonia externa*.

Vegetation of the deep canyons, with *Gunnera* and numerous cryptogams.

Subalpine fern-grass heath, with *Dicksonia*, *Lophosoria*, *Gunnera*, and numerous bryophytes.

Alpine fern-grass heath with sociations of *Acaena*, *Anthoxanthum*, and species of many other genera.

Grassland of the basal region, characterized by species of *Stipa*.

Vegetation of the sea shore, with sociations of *Adiantum chilense*, *Scirpus nodosus*, and lichens.

Derivation of the flora and fauna of Juan Fernandez and Easter Island.

The flora of Juan Fernandez has representatives of 42 families of angiosperms, one of which, *Lactoridaceae*, is endemic and monotypic. The largest families are *Compositae* with 28 species in 13 genera, *Cyperaceae* with 14 species in 7 genera, and *Gramineae* with 13 species in 10 genera. Of the 147 species, 101 are endemic or 68·7 per cent. 54 of the endemics are restricted to Masatierra (including Santa Clara) and 34 to Masafuera.

Prof. Skottsberg classifies the angiosperm flora into the following groups of elements:

1. Andine-Chilean 69 (46·9 per cent.); 2. Subantarctic-Magellanian 15 (10·2 per cent.); 3. Neotropical 19 (12·9 per cent.); 4. Pacific 26 (17·7 per cent.); 5. Atlantic–S. African 6 (4·1 per cent.); 6. Eu-Fernandezian 12 (8·2 per cent.).

The pteridophytes, 53 species in 23 genera of 6 families, include 18 endemic species (34 per cent.). On the basis of ranges of the species and their taxonomic affinities the groupings of elements recognized are: 1. Andine–Chilean 34 (64·1 per cent.); 2. Subantarctic–Magellanian 4 (7·5 per cent.); 3. Neotropical 9 (17 per cent.); 4. West Pacific 5 (9·4 per cent.); 5. Eu-Fernandezian 1 (1·9 per cent.).

131 species of mosses are recorded of which 48 are endemic and there are 124 species of liverworts of which 25 are endemic. Of lichens there are 194 species including 36 endemics.

The components of the above major plant groups are examined at some length for their taxonomic relationships and the species can be tabulated under "elements" as follows:

	Angio-sperms	Pterido-phytes	Mosses	Liver-worts	Lichens
Antarcto-tertiary ...	62 (42·2%)	32 (60·4%)	67 (55·8%)	84 (67·7%)	58 (35·4%)
Neotropical–Andean ...	54 (36·7%)	20 (37·7%)	—	—	—
Arcto–tertiary ...	23 (15·6%)	1 (1·9%)	—	—	—
Palaeotropic ...	2 (1·4%)	—	—	—	—
Austral wide seaside ...	6 (4·1%)	—	—	—	—
Neotropical	—	—	26 (21·7%)	13 (10·5%)	—
Chilean	—	—	24 (20·0%)	27 (21·8%)	—
Atlantic–Mediterranean	—	—	3 (2·5%)	—	—
Andean tropical to temperate	—	—	—	—	54 (32·9%)
Boreal	—	—	—	—	14 (8·5%)
Pantemperate–bipolar to Cosmopolitan ..	—	—	—	—	38 (23·2%)

There are no indigenous reptiles, amphibians, freshwater fishes, or mammals on the Juan Fernandez islands. Goats, rats, and mice were naturalized centuries ago and during the last quarter of a century rabbits and *Nasua rufa*. There are 15 species of birds recorded of which 3 are endemic and of the others there are 6 endemic subspecies. Lists of invertebrates are given.

In a series of five chapters are discussed some major problems of plant geography under the titles: continental and oceanic islands, the Pacific Ocean and continental drift, transoceanic migration, biological characteristics of isolated islands, and evolution in oceanic islands. A very large number of authorities are quoted and their conclusions critically examined. These chapters will be of very great value as sources of a great variety of opinions on many questions concerned with the origin and evolution of floras and faunas, especially of those separated one from another by expanses of ocean.

As regards Juan Fernandex, Prof. Skottsberg concludes that its insular peculiarities do not permit us to take a definite position against the hypothesis of former land connections. There is good geological evidence for a former extension west of the continent, uniting southern Chile with a "Juan Fernandez land".

The recorded occurrences of Tertiary floras of Chile and Patagonia are

discussed as is also the possibility of Antarctica as a source of the present circumpolar floras. On the basis of his very full analysis of geographic, geological, and biological facts and theories Prof. Skottsberg gives a tentative sketch of the history of Juan Fernandez. It must be emphasized that neither in this sketch nor elsewhere in his works is our author dogmatic. Differing and even radically opposed views are fairly stated and critically examined and he is obviously quite open to review his opinions in the light of any new knowledge. Again and again there is the alternative presented of past land connection in different directions severed now by submergence or by "drifting" or of long distance and especially transoceanic migration of disseminules. This problem was met with by J. D. Hooker many times in his phytogeographical researches (see Turrill, Pioneer Plant Geography, The Hague, 1953). There seems increasing probability that both methods of stocking have played a part in the origin and development of floras, of continental land masses as well as of oceanic islands.

Prof. Skottsberg inclines to the theory of a past land connection between Juan Fernandez with the South American continent, perhaps in the form of a peninsula, more or less comparable with Lower California. He says "The Juan Fernandez land or peninsula formed part of the neotropical Eocene flora region which extended from Venezuela and Brazil to south Chile and east across the mountains. This was a subtropical flora with podocarps, tree ferns, evergreen dicotyledonous trees, and lianas". The endemic element in the insular forest dates back, Prof. Skottsberg is inclined to believe, to early Tertiary times, with genera like *Podophorus*, *Megalachne*, *Juania*, *Ochagavia*, *Nothomyrcia*, and *Selkirkia*, and species of other genera. *Centaurodendron*, *Yunquea*, and four endemic Cichoriaceous genera are montane, old relicts, and there is no clue at all to their history. A few ferns belong to the neotropical element.

It is hard to tell how and when the non-endemic South American species reached Juan Fernandez. They are temperate and, with the exception of *Myrteola nummularia*, herbaceous. A direct transport is possible.

There is a considerable boreal element with many of the species endemic. A boreal element extends on the continent all along the Andes to the far south and must have extended southwards along the precursors of the late Tertiary mountains. The immediate Chilean connection of both the endemic and non-endemic species of the boreal group is clear.

An Antarcto-tertiary element (over 40 per cent. of the angiosperms and 60 per cent. of the ferns), is mostly of non-endemic species. It has to be assumed, says Prof. Skottsberg, either that the land connection with the continent persisted much longer than is otherwise probable or the species concerned immigrated across the water in late Pliocene or postglacial times. This argument is not clear to the writer since the occurrence of an Antarctic element in the Eocene fossil flora of the mainland is recognized from the work of Berry.

Twenty eight species of angiosperms are known from Juan Fernandez with taxonomic relations in Australasia but absent from the South American mainland flora. This element is also conspicuous amongst the ferns. Prof. Skottsberg says "I never looked in earnest for a direct road across the south Pacific from Australasia to Juan Fernandez, a route which ought to have had South America as its terminus. I perferred to think that the group in question

reached the islands over the Scotia bridge and South America where, however, it had become extinct." Again, "It is very easy to construct a hypothetical passage by which the "*Coprosma* group" reached Juan Fernandez without crossing the Antarctic or encroaching very much upon the surface of the Pacific Ocean. If we have reason to think that South America extended farther west, I cannot see why this wasn't the case also with West Patagonia and Tierra del Fuego, a region which undoubtedly has undergone considerable submergence; we have to count with a wide Scotia bridge and an extension of Palmer (Graham) Land, where the geographical-geological situation is the same as in South America and where the uplift of the mighty "Antarctandes" ought to have been accompanied by submergence of the foreland. Plants and animals could have travelled by a circuitous route from the New Zealand region over West Antarctica to Juan Fernandez without finding their way east to what is now Chile".

The absence of conifers (various genera of which occur in Chile) and of *Nothofagus* is in Juan Fernandez difficult to explain except on the assumption that severance from the mainland occurred at least during the Oligocene. Submergence resulted in displacement of vegetation belts and in much loss of life when the volcanic eruptions began with lava flows and other ejected material covered part of the island. Earlier still there was cooling of the climate from the Eocene maximum, and, with the widening of the sea between the islands and the mainland, the insular climate became more and more oceanic. Masatierra and Masafuera represent two separate centres of volcanic activity. It is supposed that the eruptions began in the Pliocene and lasted a very long time and that part of the submarine ridge was still above water when the main eruption centres became extinct. The flora and fauna were inherited from the sinking land. The biological differences between Juan Fernandez and the mainland increased during the Ice Age when West Patagonia and Fuegia were covered by inland ice. The influence of the glacial periods cannot have been very destructive on the island.

Easter Island.

The flora of Easter Island is extremely poor. The angiosperms are represented by 31 species, in 26 genera and 16 families, and there is some doubt whether all these species are indigenous. Prof. Skottsberg has grouped them on phytogeographical grounds as follows: Palaeotropical element, 22 species (70 per cent.); Austral-circumpolar element, 4 species (12·9 per cent.); Neotropical element, 5 species (16·1 per cent.). 15 species of peteridophytes, 4 of them endemic, are grouped as follows: Palaeotropical element, 11 species (73·3 per cent.); Austral-circumpolar element, 3 species (20 per cent.); Neotropical element, 1 species (6·7 per cent.). The known mosses (14 species, including 9 endemics), one hepatic, 23 species (4 regarded as endemic) of lichens, and one species of fungus are listed. Indigenous vertebrates, apart from birds, are lacking. Lists of the known birds and invertebrates are given.

Easter Island is volcanic with the highest point 530 m. but there is no humid montane belt with a fairly luxuriant arboreous vegetation. There are no endemic genera, no highly peculiar endemic species, and no preponderance of woody plants. *Sophora toromiro* is the only tree and *Lycium carolinianum* var. *sandvicense* the only shrub. Except *Gramineae*, which domin-

ate, and *Cyperaceae*, most large and world-wide families, even *Compositae*, are absent. There are no conifers and no orchids but a fair number of ferns. The geographical position is unfavourable to immigration since America is 3700 km. distant and Pitcairn, the nearest basaltic islet, 1850 km. On the other hand, the chances of establishment of disseminules should have been good. Perhaps the bulk of the original flora and fauna was destroyed by man for the island has been heavily populated.

There is no lack of hypotheses according to which Easter Island is the remnant of a mid-Pacific continent or a land bridge uniting the Australian–New Zealand area with South America and Hawaii. None of these has much evidence to support it. Prof. Skottsberg sums up in these words: "There is in the Pacific Ocean no island of the size, geology and altitude of Easter Island with such an extremely poor flora and with a subtropical climate favourable for plant growth, but nor is there an island as isolated as this, and the conclusion will be that poverty is a result of isolation—even if man is responsible for the disappearance of part of the flora, it cannot have been rich.—Easter is a good example of an island peopled by 'waifs and strays' ".

The Mixed Border.*—The author of this book tells us that "the mixed border stands mid-way between two extremes: the shrubbery on the one hand and the herbaceous border on the other . . . The true shrub enthusiast will only permit the incursion of herbaceous material in the very early stages of his shrubbery, just to stop a gap until . . . he feels assured that his shrubs have grown large enough to take full possession. The purist among herbaceous border advocates has an even more exclusive code of rules and . . . his border can only include hardy herbaceous material; no shrubs, bulbs, annuals, biennials or even tender herbaceous plants". This then is a book for all lovers of the mixed border, a form of gardening which we are given to understand has great possibilities.

The book is divided into two parts. In the first part the organization, planning, planting, the annual overhaul, its treatment in the spring, summer's tasks, and the cold frame are described in a readable, interesting and instructive manner. After the introduction to part two the author goes on to give a descriptive account of the plants suitable for growing in the mixed border including shrubs, hardy herbaceous plants, half-hardy perennials, annuals and biennials. The Appendix lists "plants of architectural value in the mixed border, either for their flowers or foliage". The book concludes with a useful glossary and an index.

Since the author of this book has developed one of the finest examples of the mixed border at his home, Great Dixter, in Sussex, he writes with some authority on the subject and has produced a book which will furnish all gardeners with a host of facts and information relating to the mixed border. The book is well-illustrated with 78 excellent photographs of the plants recommended.

H. S. MARSHALL.

* The Mixed Border. By Christopher Lloyd. London: W. H. & L. Collingridge Ltd. 1957. Pp. 196, illus. 35/-.

African Violets and their kin.*—The gesneriads are a numerous clan: 1500–2000 species perhaps. Their genera are difficult to define and the sudden upsurge of their popularity as house-plants has demanded a guide to the cultivated species before a definitive taxonomic treatment of the family is available. Dr. Moore has met this need with a book of the moment —and it is admirable. After five short chapters devoted to cultural aspects he gives a very helpful and clear account of the species (nearly 150 in number) now in cultivation in America, and also some notes on the more important hybrids. If the British reader is sometimes surprised at the selection of species mentioned, that merely reflects the differences in the horticultural repertoire of the two countries. It would not be difficult to find more species of *Streptocarpus* in Britain: it might be hard to find as many of *Achimenes* or *Alloplectus*. *Sarmienta repens* is the most surprising absentee but the only other Chilian gesneriads, *Mitraria coccinea* and *Asteranthera ovata*, are both present. Incidentally the statement (p. 241) that the two latter may be treated like *Columnea* can only refer to their possible use in baskets, not to the temperature régime of their culture.

Dr. Moore has sensibly cut adrift from the current, rather unsatisfactory, botanical classifications. A less technical approach has led to an intelligible deployment of the relatively few species with which he is now concerned. Perhaps *Briggsia*, placed among Miscellaneous Genera, almost qualifies for Chapter 8 (Gesneriads with scaly rhizomes) when, as here, represented only by the anomalous *B. kurzii*; any other species would be sought alongside *Haberlea* in Chapter 11 (European and Asiatic Gesneriads without visible stems).

The excellent text is matched by the illustrations by Marion Ruff Sheehan. There are many useful figures in black and white and five pleasingly informal colour plates. Four are good; the fifth has too much yellow in all the leaves, makes *Streptocarpus Wendlandii* purple instead of blue and so dulls the brilliance of *Ramonda* that it is but a dismal nightshade of its true self.

B. L. Burtt.

* African Violets, Gloxinias and their relatives. A guide to the cultivated gesneriads. By Harold E. Moore, Jr. Illustrated by Marion Ruff Sheehan. New York & London. The Macmillan Company, 1957. Pp. xii + 324 with numerous drawings and five colour plates. Price ten dollars or 45 shillings and sixpence.

Outdoor Chrysanthemums.*—This book is devoted exclusively to outdoor chrysanthemums. Full details of cultivation are given from propagation to flowering time, including a complete cultural programme month by month, a catalogue of varieties, together with a chapter on exhibiting and the qualities of the perfect flower. The author himself is a successful exhibitor and the information and many useful hints contained in this book are the result of long experience in growing these popular plants. The book is well illustrated with line drawings and photographs.

H. S. Marshall.

* Outdoor Chrysanthemums for garden and exhibition. By E. Morley Jones, London: W. H. & L. Collingridge Ltd., New York: Transatlantic Arts Inc. 1958. Pp. 117. Price 18/-.

Nomenclatural Notes: VI*

A. A. Bullock

Type species of some generic names

Exallage *Bremekamp* in Verh. Kon. Ned. Akad. Wetensch. Ser. 2, 48 (2): 140. May 1952 (*Rubiaceae*).

Exallage auricularia (*Linnaeus*) *Bremekamp, l.c.; holotypus nominis generici.*

Hedyotis auricularia Linnaeus, Sp. Pl. 101. 1753.

This species was formerly selected (Hitchcock in Prop. Brit. Bot. 123. 1929) as type of the generic name *Hedyotis* Linn. The reason for rejecting it in this role was given by Bremekamp (*l.c.* 29) and is repeated and endorsed below (p. 99).

Exolobus *Fournier* in Martius, Fl. Bras. 6 (4): 318. June 1885 (*Asclepiadaceae*).

Exolobus patens (*Decne.*) *Fournier, l.c., t.* 94; *lectotypus nominis generici.*

Gonolobus patens Decne. in DC. Prodr. 8: 594. March 1844.

Fournier included three species in this genus; the one selected as type of the generic name was accurately illustrated and drawings of dissections were given.

Hedyotis *Linnaeus*, Sp. Pl. 101. 1753; Gen. Pl. ed. 5, 44. 1754 (*Rubiaceae*).

Hedyotis fruticosa *Linnaeus, l.c.*; *lectotypus nominis generici*, vide Bremekamp in Verh. Kon. Ned. Akad. Wetensch. Ser. 2, 48 (2): 29. 1952.

The reason for rejecting the earlier choice (Hitchcock in Prop. Brit. Bot. 123. 1929) of *H. auricularia* Linn. as lectotype of the generic name *Hedyotis* was given by Bremekamp (*l.c.*) and is repeated and endorsed below (p. 99).

Hemipogon *Decne.* in DC. Prodr. 8: 509. March 1844 (*Asclepiadaceae*).

Hemipogon acerosus *Decne. l.c.*; DC. in Deless. Ic. 5: 26. *t.* 60. 1846; *lectotypus nominis generici.*

This is the first of the two species listed in the *Prodromus*. The Delessert figure was available to Decaisne, as well as the specimen in the Paris herbarium. The only other species, *H. setaceus* Decne. was apparently known to Decaisne from a specimen in the Monaco herbarium and there is no reason to prefer it as lectotype of the generic name.

Kadua *Chamisso et Schlechtendal* in Linnaea 4: 157. 1829 (*Rubiaceae*).

Kadua cookiana *Chamisso et Schlechtendal, l.c.* 158; *lectotypus nominis generici.*

The genus was deliberately described to include the five species referred to it and there is apparently no good reason for choosing one rather than another as the lectotype of the generic name. The choice above is the first species listed by Chamisso and Schlechtendal, and is an arbitrary one, for the purpose of preparing a card for *Index nominum genericorum*. It may be noted that a sixth species is noted by Chamisso and Schlechtendal (*l.c.* 164) as being

* Continued from Kew Bull. 1958: 88. 1958.

allied to *Kadua*, with the reference "*Kaduae affinis*". This has been wrongly included in *Index Kewensis* as *Kadua affinis* Cham. et Schlecht. The plant is *Gouldia sandwicensis* A. Gray.

Orthosia *Decne.* in DC. Prodr. 8: 526. March 1844 (*Asclepiadaceae*).

Orthosia congesta (*Vellozo*) Decne. *l.c.* 527; *lectotypus nominis generici.*

Cynanchum congestum Vellozo, Fl. Flum. 122. 1825.

Of the five species certainly referred to this genus by Decaisne, *O. congesta* was the only one of which he had seen a published figure as well as a specimen. Its choice as lectotype of the generic name is otherwise quite arbitrary, but no other species seems to have any advantage over it.

Pycnoneurum *Decne.* in Ann. Sc. Nat. sér. 2, 9: 340. 1838 (*Asclepiadaceae*).

Pycnoneurum junciforme *Decne. l.c.*; *lectotypus nominis generici.*

Decaisne enumerated two species in this genus, of which *P. junciforme* was the first. Since he appeared to be chiefly concerned with characteristics of this species in distinguishing *Pycnoneurum* from other genera, it is here proposed as lectotype of the generic name.

Pygmaeothamnus *W. Robyns* in Bull. Jard. Bot. Brux. 11: 29. May 1928 (*Rubiaceae*).

Pygmaeothamnus zeyheri (Sonder) W. Robyns, *l.c.* 30, *ff.* 7–8, *lectotypus nominis generici*, vide Phillips, Gen. S. Afr. Fl. Pl. ed. 2, 730. 1951.

Pachystigma zeyheri Sonder in Linnaea 23: 56. 1850.

Robyns enumerated four species of this genus, but provided figures of only one of them and did not indicate a holotype. *P. zeyheri* is undoubtedly the most important and widely distributed of the species, and Phillips was amply justified in citing it as lectotype of the generic name.

Rouliniella *Vail* in Bull. Torrey Bot. Club 29: 662. 1902 (*Asclepiadaceae*).

Roulinia Decne. in DC. Prodr. 8: 516. 1844, non Brongniart, 1840.

Rouliniella corymbosa (*Decne.*) *Bullock*, comb. nov.; *lectotypus nominis generici.*

Roulinia corymbosa Decne. *l.c.* 517; DC. in Deless. Icon. 5: 27, *t.* 62. 1846.

The unpublished plates of Delessert's work were available to Decaisne when he prepared his account of the *Asclepiadaceae* for the *Prodromus*. He placed *R. corymbosa* first in his enumeration of eleven species and it seems clear that he made full use of the excellent figure in drawing up his generic description. No other of the species enumerated by Decaisne appears to have a better claim for selection as lectotype of the generic name.

Toxocarpus *Wight et Arnott* in Wight, Contrib. Bot. India 61. 1834 (*Asclepiadaceae*).

Toxocarpus kleinii Wight et Arnott, *l.c.*; *lectotypus nominis generici.*

Of the four species included in this genus by Wight and Arnott, *T. crassifolius* Wight et Arnott and *T. laurifolius* (Roxb.) Wight et Arnott were transferred to *Genianthus* by J. D. Hooker (Fl. Brit. Ind. 4 (1): 16. 1883). Of the other two *T. kleinii* is arbitrarily chosen as type of the generic name.

Tweedia *W. J. Hooker et Arnott* in Hooker, Journ. Bot. 1 : 291. 1834. (*Asclepiadaceae*).

Tweedia macrolepis *W. J. Hooker et Arnott, l.c.*; *lectotypus nominis generici.*

Three species, one of them doubtful, were originally included in this genus. *T. macrolepis* has been chosen as lectotype of the generic name because it is the only one of them collected by John Tweedie, after whom the genus was named.

Wylia *G. F. Hoffmann,* Gen. Umbell. 3. *t.* 2. 1814 (*Umbelliferae*).

Wylia radians *G. F. Hoffmann, l.c.* 11; *lectotypus nominis generici.*

Wylia is not now regarded as a genus distinct from *Scandix* Linn. and the lectotype species chosen above (because it is the one species out of four most completely figured by Hoffmann) is usually considered to be conspecific with *Scandix grandiflora* Linn.

Hedyotis *Linn.* and **Exallage** *Bremek.* (**Rubiaceae**).

The generic name *Hedyotis* was validly published in 1753 (Linn. Sp. Pl. 101) and Linnaeus included three species, *H. fruticosa*, *H. auricularia* and *H. herbacea.* Of these, *H. herbacea* now finds a place alongside *Oldenlandia corymbosa* Linn. as a member of the section *Oldenlandia* in the genus *Oldenlandia* Linn., in the restricted sense of Bremekamp (Verh. Kon. Ned. Akad. Wetensch. Ser. 2, 48 (2): 183. 1952) and the same author pointed out (1952, p. 29) that the choice of *H. auricularia* Linn. as lectotype species of the name *Hedyotis* by Chamisso and Schlechtendal (Linnaea 4 : 153. 1829) and by Hitchcock (Prop. Brit. Bot. 123. 1929), was a bad one because the species is described as having indehiscent fruits whereas the fruit of the genus *Hedyotis* is described as being dehiscent. For this reason Bremekamp, relying upon the terms of Art. 8 of the [present] Code, proposed that *H. fruticosa* should be the lectotype of the generic name. With this procedure the writer is in full agreement.

It is perhaps unfortunate that Bremekamp (1952, p. 140) selected *Hedyotis auricularia* Linn. as holotype of his new generic name *Exallage*, as he admitted that he was not then prepared to describe the genus fully, or to list all its numerous species. His diagnostic phrase is, however, sufficient to validate publication of the name, and there can be no doubt as to the circumscription of the genus. The necessary references, for the purpose of *Index Nominum Genericorum*, are given above (p. 97).

Acceptance of Bremekamp's proposals is advisable, further, since adherence to the original lectotype will involve a considerable number of name changes if his taxonomic treatment is accepted either wholly or in part.

On the date of publication of the generic name Ritchiea (**Capparidaceae**)

Robert Brown discussed various genera of *Capparidaceae* in his account of Dr. Oudney's plants collected during the Denham and Clapperton expedition of 1822–24. In particular, he was much struck by the remarkable aestivation shown by members of the genus *Crateva** Linn. and on this feature alone he was able to exclude the African plant which had been named *Crateva fragrans* Sims. Brown remarked that "*Crateva adansonii* . . . .

* This is the correct spelling, though it frequently appears in the literature as *Crataeva*.

is the only known species of the African continent . . . . ." and later " . . . . . *Crateva* agrees . . . . . in the remarkable aestivation of its flower with *Cleome* [sect.] *Gymnogonia*, by which character, along with that of its fruit, it is readily distinguished from every other genus of the order. Although this character of its aestivation has never before been remarked, yet all the species referred to *Crateva* by M. de Candolle really belong to it, except *C. fragrans*, which, with some other plants from the same [African] continent forms a very distinct genus which I shall name *Ritchiea* . . . . ."

Here there is no doubt whatever that Brown intended to establish a new genus based upon *Crateva fragrans* but there is no descriptive matter whatever in his text. All he said was that *Crateva* was characterized by a particular aestivation; it is implied that *Crateva fragrans* shows a different aestivation but there is no indication of what that aestivation is and no other generic character by which *Ritchiea* may be distinguished is given. Under Art. 38 of the Code it is not sufficient to list the species included in a new genus to validate publication of its name.

There is no guidance on the point in the Code and there may be considerable argument as to the limit of meagreness of description which is acceptable for the validation of publication of names, but it seems logical to expect that, be it ever so meagre, the description must give at least one positive character which is shown uniquely (or uniquely among a given group of taxa) by the taxon concerned. A statement of absence of a particular character which is in fact possessed uniquely by another taxon (or group of taxa) is not by any means the same thing, and cannot constitute an acceptable description.

Brown announced his separation of *Ritchiea* from *Crateva* in his "Observations" which formed an Appendix to Denham and Clapperton, Narrative of Travels and Discoveries in Northern and Central Africa" published in 1826,† but valid publication of the name was delayed until 1831, when it appeared, attributed to R. Brown, on page 276 of the first volume of G. Don's "General System". Don, unfortunately, adopted the spelling *Richiea*, "to the memory of Mr. Richie; the African traveller, died 1821, at Tripoli"; this, however, may be treated as an orthographic error.

This conclusion was reached also by Britten (Journ. Bot. 55: 278) as long ago as 1917. He also pointed out that *Crateva fragrans* is an illegitimate (superfluous) name for *C. capparoides* Andrews and gave the correct synonymy, which is as follows:—

Ritchiea *R. Brown* [in Denham et Clapperton, Narr. Trav. N. Centr. Afr. 225. 1826, nomen in obs.] *ex G. Don*, Gen. Syst. 1: 276. 1831, descr. lat. (ubi errore "*Richiea*").

R. capparoides (*Andrews*) *Britten* in Journ. Bot. 55: 279. 1917; *holotypus nominis generici.*

Crateva capparoides Andrews, Bot. Rep. *t.* 176. 1801.

C. fragrans Sims in Bot. Mag. *t.* 596. 1802, *nomen superfluum.*

Ritchiea fragrans (Sims) G. Don, *l.c.* 277.

There is a specimen in *Herb. Banks.* labelled *Crateva moschata*, but this name has never been validly published.

† Reprinted verbatim in Brown's Miscellaneous Botanical Works, vol. 1, pp. 257–303 (1866).—Ray Society publication.

Xylaria versus Hypoxylon and Xylosphaera

R. W. G. Dennis

In two recent papers I have attempted to define the tropical American fungi currently referred to the genus *Xylaria*, evading for the time the nomenclatorial problem involved in the use of that name. Species of *Xylaria* in the sense of modern authors were included by Fries in the second volume of *Systema mycologicum*, 1823, in Series II, *Hypoxylon* of Tribe I, *Cordyceps*, within the comprehensive genus *Sphaeria* Hall. In the following year Greville (1824), printed a diagnosis of a genus *Xylaria*, ascribed to the pre-friesian author Hill, embracing three species, *X. hypoxylon*, *X. digitata* and *X. polymorpha*, all adopted from Persoon's *Synopsis fungorum*, 1801, in which they figured under *Sphaeria*. The name *Xylaria* in the sense of Greville was adopted by Fries (1849) and has since come to be combined in some 400 specific names, though the number of species is probably less than a quarter of this.

As long as valid publication of the names of Fungi caeteri was held to commence with the date of publication of the part of *Systema mycologicum* in which they were dealt with the name *Xylaria* was clearly correctly employed in the above sense. At the International Botanical Congress at Stockholm (1950), however, it was decided that valid publication of names of all Fungi caeteri must be held to commence on 1st January, 1821, provided that names published between 1821 and 1832 did not conflict with those used by Fries in any part of *Systema mycologicum* or *Elenchus fungorum*. By this decision *Xylaria* Grev. became a later homonym of *Xylaria* S. F. Gray 1821, a genus of 6 species, none of which would be regarded today as congeneric with the 3 species of Greville 1824. Modern authors refer 3 of S. F. Gray's species to *Cordyceps* (Fr.) Link, 1 to *Podostroma* Karst. 1 in part to *Clavaria* Fr. while the sixth is an entomogenous fungus of doubtful character. The fungi which became the foundation species of *Xylaria* Grev. were placed by S. F. Gray in a genus *Hypoxylon*. His usage of this name was, however, antedated in 1821 by that of Mérat. *Hypoxylon* Mérat included 5 species viz. *H. militare* (L.) Mérat, *H. radicosum* (Bull.) Mérat, *H. cornutum* (Hoffm.) Mérat, which is the fungus commonly called *Xylaria hypoxylon* today, *H. polymorphum* (Pers.) Mérat and *H. digitatum* (L.) Mérat. In modern usage the first named is a species of *Cordyceps*, the last three and possibly the second belong to *Xylaria* Grev.

Recently my good friend Dr. M. A. Donk has drawn my attention to another validly published generic name available for the species of *Xylaria* Grev. non S. F. Gray viz. *Xylosphaera* Dumortier (1822). Dumortier divided the comprehensive genus *Sphaeria*, which had been validated for modern usage by Mérat in the previous year, into nineteen genera, each briefly diagnosed in Latin and provided with a list of the specific epithets transferred to it from *Sphaeria*. To *Xylosphaera* he referred 8 species, 7 at least have subsequently been placed in *Xylaria* Grev.

As matters stand the currently accepted genera *Xylaria*, *Hypoxylon* and

Cordyceps are all untenable on account of the earlier valid publication of *Hypoxylon* Mérat and *Xylaria* S. F. Gray. The simplest solution of this nomenclatural tangle appears to be to select *Hypoxylon militaris* [L.] Mérat as the lectotype of *Hypoxylon* Mérat, thus clearing the way for adoption of *Xylosphaera* Dumortier in place of *Xylaria* Grev. *Xylaria* S. F. Gray can either be eliminated by selecting as lectotype the same species as that suggested for *Hypoxylon* Mérat or be adopted to replace the small genus *Podostroma* Karst. by selection as lectotype of *Xylaria alutacea* (Pers.) S. F. Gray. It will probably be found convenient to propose *Cordyceps* (Fr.) Link for conservation against *Hypoxylon* Mérat, *Corynesphaera* Dumortier and *Mitrasphaera* Dumortier, thus at the same time making it possible to retain the use of *Hypoxylon* Bull. ex Fr. in its present usage. It should be pointed out, however, that *Gamosphaera* Dumortier is so circumscribed as to offer an earlier name for *Hypoxylon* Bull. ex Fr.

The species of *Xylaria* Grev. discussed in my former papers are redisposed below in accordance with the above suggestions.

Xylosphaera Dumortier. Commentationes botanicae p. 91, 1822 non *Xylosphaeria* Otth 1869. " Sphaerulae stigmostomae, receptaculo suberoso ".

Type species (selected) *X. polymorpha* (Pers. ex Mérat) Dumortier.

Xylosphaera adscendens (*Fr.*) *Dennis*, comb. nov.

Sphaeria adscendens Fr. in Linnaea 5, 537 (1830).

Xylosphaera aenea (*Mont.*) *Dennis*, comb. nov.

Xylaria aenea Mont. in Ann. Sci. Nat. Bot. Ser. 4, 3, 100 (1855)

Xylosphaera anisopleura (*Mont.*) *Dennis*, comb. nov.

Hypoxylon anisopleura Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 348 (1840).

Xylosphaera apiculata (*Cooke*) *Dennis*, comb. nov.

Xylaria apiculata Cooke in Grevillea 8, 66 (1879).

Xylosphaera appendiculata (*Ferd. et Winge*) *Dennis*, comb. nov.

Xylaria appendiculata Ferd. & Winge in Bot. Tidssk. 29, 17 (1908).

Xylosphaera aristata (*Mont.*) *Dennis*, comb. nov.

Xylaria aristata Mont. in Ann. Sci. Nat. Bot. Ser. 4, 3, 106 (1855).

Xylosphaera axifera (*Mont.*) *Dennis*, comb. nov.

Xylaria axifera Mont. in Ann. Sci. Nat. Bot. Ser. 4, 3, 107 (1855).

Xylosphaera berkeleyi (*Mont.*) *Dennis*, comb. nov.

Xylaria berkeleyi Mont. in Grevillea 11, 85 (1883).

Xylosphaera brasiliensis (*Theiss.*) *Dennis*, comb. nov.

Xylaria arenicola Walw. & Curr. var. *brasiliensis* Theiss. in Ann. mycol. 6, 343 (1908).

Xylosphaera bulbosa [Pers.] Dumortier Comm. bot. p. 91 (1822).

Xylosphaera carpophyla [Pers.] Dumortier Comm. bot. p. 92 (1822).

Xylosphaera coccophora (*Mont.*) *Dennis*, comb. nov.
Xylaria coccophora Mont. in Ann. Sci. Nat. Bot. Ser. 4, 3, 109 (1855).

Xylosphaera comosa (*Mont.*) *Dennis*, comb. nov.
Hypoxylon comosum Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 345 (1840).

Xylosphaera cornu-damae (*Schwein.*) *Dennis*, comb. nov.
Sphaeria cornudamae Schwein in Trans. Amer. Phil. Soc. N.S. 4, 189 (1834).

Xylosphaera cubensis (*Mont.*) *Dennis*, comb. nov.
Hypoxylon cubense Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 345 (1840).

Xylosphaera cupressiformis [Mich.] Dumortier Comm. bot. p. 92 (1822).

Xylosphaera curta (*Fr.*) *Dennis*, comb. nov.
Xylaria curta Fr. in Nov. Act. Reg. Soc. Sci. Upsal. Ser. 3, 1, 126 (1851).

Xylosphaera dealbata (*Berk. et Curt.*) *Dennis*, comb. nov.
Xylaria dealbata Berk. & Curt. in J. Acad. Nat. Sci. Philadelphia N.S. 2, 284 (1853).

Xylosphaera deserticola (*Speg.*) *Dennis*, comb. nov.
Xylaria deserticola Speg. in Ann. Mus. Nac. Buenos Aires 8, 70 (1902).

Xylosphaera dichotoma (*Mont.*) *Dennis*, comb. nov.
Hypoxylon dichotomum Mont. apud R. de la Sagra Flora Cubana 1, 214 (1845).

Xylosphaera digitata (L. ex Mérat) Dumortier Comm. bot. p. 92 (1822).

Xylosphaera euphorbiicola (*Rehm*) *Dennis*, comb. nov.
Xylaria euphorbiicola Rehm in Hedwigia 40, 147 (1901).

Xylosphaera feejeensis (*Berk.*) *Dennis*, comb. nov.
Sphaeria feejeensis Berk. in Hooker's London J. Bot. 1, 456 (1842).

Xylosphaera filiformis (*Alb. & Schwein. ex Fr.*) *Dennis*, comb. nov.
Sphaeria filiformis Alb. & Schwein. ex Fr. Syst. myc. 2, 329 (1823).

Xylosphaera fulvella (*Berk. & Curt.*) *Dennis*, comb. nov.
Xylaria fulvella Berk. & Curt. in J. Linn. Soc. Bot. 10, 380 (1869).

Xylosphaera grammica (*Mont.*) *Dennis*, comb. nov.
Hypoxylon grammicum Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 331 (1840).

Xylosphaera guaranitica (*Speg.*) *Dennis*, comb. nov.

Kretzschmaria guaranitica Speg. in Ann. Soc. Cient. Argentina 18, 276 (1884).

Xylosphaera guyanensis (*Mont.*) *Dennis*, comb. nov.

Hypoxylon guyanense Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 343 (1840).

Xylosphaera hippotrichoides (*Sow. ex Fr.*) *Dennis*, comb. nov.

Thamnomyces hippotrichoides [Sow.] Ehrenb. ex Fr. Syst. mycol. 3, 184 (1832).

Xylosphaera hyperythra (*Mont.*) *Dennis*, comb. nov.

Hypoxylon hyperythrum Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 343 (1840).

Xylosphaera hypoxylon [L.] Dumortier Comm. bot. 91 (1822).

Xylosphaera ianthino-velutina (*Mont.*) *Dennis*, comb. nov.

Hypoxylon xanthino-velutinum Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 348 (1840).

Xylosphaera inaequalis (*Berk. et Curt.*) *Dennis*, comb. nov.

Xylaria inaequalis Berk. & Curt. in J. Linn. Soc. Bot. 10, 382 (1869).

Xylosphaera juruensis (*P. Henn.*) *Dennis*, comb. nov.

Xylaria juruensis P. Henn. in Hedwigia 43, 262 (1904).

Xylosphaera kegeliana (*Lév.*) *Dennis*, comb. nov.

Sphaeria kegeliana Lév. in Ann. Sci. Nat. Bot. Ser. 3, 5, 256 (1846).

Xylosphaera longipes (*Nitschke*) *Dennis*, comb. nov.

Xylaria longipes Nitschke Pyrenomycetes Germanici 14 (1867).

Xylosphaera luxurians (*Rehm*) *Dennis*, comb. nov.

Xylaria carpophila var. *luxurians* Rehm in Hedwigia 40, 147 (1901).

Xylosphaera melanopus (*Lév.*) *Dennis*, comb. nov.

Chaenocarpus melanopus Lév. in Ann. Sci. Nat. Bot. Ser. 4, 20, 294 (1863).

Xylosphaera mellissii (*Berk.*) *Dennis*, comb. nov.

Hypoxylon mellissii Berk. apud Melliss, St. Helena p. 379 (1875).

Xylaria arbuscula Sacc. in Michelia 1, 249 (1878).

Xylosphaera microceras (*Mont.*) *Dennis*, comb. nov.

Hypoxylon microceras Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 348 (1840).

Xylosphaera micrura (*Speg.*) *Dennis*, comb. nov.

Xylaria micrura Speg. in Ann. Mus. Nac. Buenos Aires 6, 262 (1899).

Xylosphaera multiplex (*Kze.*) *Dennis*, comb. nov.
Sphaeria multiplex Kunze apud Fr. in Linnaea 5, 556 (1830).

Xylosphaera myosurus (*Mont.*) *Dennis*, comb. nov.
Xylaria myosurus Mont. in Ann. Sci. Nat. Bot. Ser. 4, 3, 110 (1855).

Xylosphaera nigripes (*Klotzsch*) *Dennis*, comb. nov.
Sphaeria nigripes Klotzsch in Linnaea 7, 203 (1832).

Xylosphaera nodulosa (*Lloyd*) *Dennis*, comb. nov.
Xylaria nodulosa Lloyd in Mycological Notes 6, 1007 (1920).

Xylosphaera oxyacanthae (*Tul.*) *Dennis*, comb. nov.
Xylaria oxyacanthae Tul. Sel. Fung. Carp. 2, 15 (1863).

Xylosphaera palmicola (*Winter*) *Dennis*, comb. nov.
Xylaria palmicola Winter in Grevillea 15, 89 (1887).

Xylosphaera papyrifera (*Link*) *Dennis*, comb. nov.
Sphaeria papyrifera Link apud Fries in Linnaea 5, 536 (1830).
Sphaeria allantodea Berk. in Ann. Mag. Nat. Hist. 3, 397 (1839).

Xylosphaera phoenix (*Kunze*) *Dennis*, comb. nov.
Sphaeria phoenix Kunze apud Fries in Linnaea 5, 541 (1830).

Xylosphaera phosphorea (*Berk.*) *Dennis*, comb. nov.
Xylaria phosphorea Berk. in J. Linn. Soc. Bot. 13, 177 (1872).

Xylosphaera phyllocharis (*Mont.*) *Dennis*, comb. nov.
Xylaria phyllocharis Mont. in Ann. Sci. Nat. Bot. Ser. 4, 3, 108 (1855).

Xylosphaera platypoda (*Lév.*) *Dennis*, comb. nov.
Sphaeria platypoda Lév. in Ann. Sci. Nat. Bot. Ser. 3, 3, 40 (1845).

Xylosphaera poitei (*Lév.*) *Dennis*, comb. nov.
Sphaeria poitei Lév. in Ann. Sci. Nov. Bot. Ser. 3, 3, 40 (1845).

Xylosphaera polymorpha (Pers. ex Mérat) Dumortier Comm. Bot. p. 92 (1822).

Xylosphaera regalis (*Cooke*) *Dennis*, comb. nov.
Xylaria regalis Cooke in Grevillea 11, 86 (1883).

Xylosphaera rhizocola (*Mont.*) *Dennis*, comb. nov.
Hypoxylon rhizocola Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 344 (1840).

Xylosphaera rhizomorpha (*Mont.*) *Dennis*, comb. nov.
Hypoxylon rhizomorpha Mont. in Ann. Sci. Nat. Bot. Ser. 2, 13, 341 (1840).

Xylosphaera rickii (*Theiss.*) *Dennis*, comb. nov.
Xylaria rickii Theiss. in Ann. mycol. 6, 342 (1908).

Xylosphaera ruginosa (*Mont.*) *Dennis*, comb. nov.
Xylaria ruginosa Mont. in Ann. Sci. Nat. Bot. Ser. 4, 3, 103 (1855).

Xylosphaera schwackei (*P. Henn.*) *Dennis*, comb. nov.
Xylaria schwackei P. Henn. in Hedwigia 34, 108 (1895).

Xylosphaera scruposa (*Fr.*) *Dennis*, comb. nov.
Sphaeria scruposa Fr. Elenchus fungorum 2, 55 (1828).

Xylosphaera smilacicola (*Speg.*) *Dennis*, comb. nov.
Xylaria smilacicola Speg. in Ann. Mus. Nac. Buenos Aires 19, 348 (1909).

Xylosphaera telfairii (*Berk.*) *Dennis*, comb. nov.
Sphaeria telfairii Berk. in Ann. Mag. Nat. Hist. 3, 397 (1839).

Xylosphaera theissenii (*Lloyd*) *Dennis*, comb. nov.
Xylaria theissenii Lloyd in Mycological Notes 5, 677 (1917).

Xylosphaera ustorum (*Pat.*) *Dennis*, comb. nov.
Poronia ustorum Pat. in Bull. Soc. mycol. France 3, 165 (1888).

Xylosphaera venustula (*Sacc.*) *Dennis*, comb. nov.
Xylaria venustula Sacc. in Ann. mycol. 4, 76 (1906).

Mechanisation in the Garden.*—This manual for commercial growers of plants in pots, boxes or other containers describes a system developed at the California Agricultural Experiment Station. A general summary is given by the editor, and the various aspects of the system are discussed in considerable detail by specialists. The aim is to produce better plants more cheaply by maximum mechanisation, and the elimination of pests, diseases, soil salinity and other toxicities. Great stress is laid on hygiene and measures to maintain healthy stocks are clearly described for the practical grower. Sterilised, standardised composts are advocated, these consisting only of sand and an organic component such as peat moss, saw-dust or rice hulls. These composts are found to satisfy the physical requirements of a growing medium, and the chemical needs of the plants are met by fertilisers added dry or supplied in the irrigation water.

This is a work of undoubted value to horticultural industrialists, but one hopes that in their leisure hours they may know the pleasure of just pottering about in totally unscientific gardens.

J. E. Souster.

* The U.C. System for Producing Healthy Container-Grown Plants. Edited by Kenneth F. Baker. Manual 23 of the California Agricultural Experiment Station Extension service, $1.00.

Notes on African Rosaceae: V

R. A. Graham

A new species of Rubus from Tanganyika.

In his *Notes on African Rubi in the Kew Herbarium* (K.B. 1938: 182 (1938)) C. E. Gustafsson described a new variety, var. *roseus*, of *Rubus apetalus* Poir., using as his holotype (and sole example) a rather meagre specimen from the Poroto Mountains, in the Mbeya District of Tanganyika (*Michelmore* 965). Additional material—all from the same neighbourhood—has now come to hand, as a result of which it becomes apparent that there grows in these mountains a bramble not satisfactorily referrable to any other known African taxon and not necessarily closely related to *R. apetalus*. It is therefore proposed to treat this bramble as a new species: the binomial *R. roseus* being already in use it is necessary to provide a new epithet; and as Gustafsson's text is inadequately short it is proposed also to furnish a new description based on new type material.

Rubus porotoënsis *R. A. Graham*, species nova differt (1) a *R. scheffleri* Engl. foliis magis bullatis aliquando latioribus, foliorum indumento magis piloso non tomentoso, caulibus epruinosis tomentosis vel pilosis ut videtur non glabrescentibus, petalis roseis vel puniceis non albis; (2) a *R. keniense* Standl. (specie trifoliolata) foliis imparipinnatis; (3) a *R. apetalo* Poir. foliis magis bullatis subtus viridibus pilosis non viridi-vel albo-tomentosis, petalis majoribus.

Frutex scandens. Caulis ± teres vel obtuse quadrangulatus, inter inflorescentiam flexuosus, indumento tomentoso pilis ± mollibus patentibus et glandibus rubris ± sessilibus interspersis vestitus, aculeis 1·5–4 mm. longis decurvatis vel rigidis armatus. Folia imparipinnata vel supra trifoliolata, illa turionum illis ramorum floriferorum forma ut videtur similia, 4–8 × c. 2·2–5·5 cm., ovato-oblonga vel ovata vel oblongo-elliptica apice obtusa vel acutissime acuminata basi latissime cuneata rotunda vel subcordata, margines dentibus argutis inaequalibus multiserrati, lamina supra bullata nervatione depresso, brunneo- vel nigro-viridia, sparse pilosa, subtus pallidiore viridia nervatione valde prominente piloso; petiola aculeolata, 3·5–4 cm. longa; petiolula lateralia ad 6 mm. longa, terminalia c. 1·5 cm.; foliola nonnihil magnitudine inaequalia et asymmetrica. Stipulae linearioblanceolatae acutae 1–1·5 cm. longae. Inflorescentia late pyramidalis floribunda, c. 20 × 13 cm., efoliosa; ramuli pedunculi et pedicelli tomentosi pilis pallide flavis nonnihil dense interspersis, aculeis et glandibus subsessilibus muniti. Sepala albo-viridia tomentosa lanceolata 7-8 mm. longa, patentia, apice caudata, basi per 2–3 mm. connata. Petala 9× 8 mm., roseo-punicea vel pallide punicea ± rotunda in unguem brevem basi brevissime angustata. Stamina filamentis 3·5–4·5 mm. longis glabris, antheris ± 1 mm. longis. Styli punicei leviter arcuati 3–3·5 mm. longi. Carpella (immatura tantum) dense albotomentosa. Typus: Tanganyika, Mbeya District: (M)Poroto Mountains, 1957, *Richards* 9700 (K, holo. !).

Syn. *R. apetalus* Poir. var. *roseus* C. E. Gust. in K.B. 1938: 182 (1938). Type: Poroto Mts., near Mbeya, *Michelmore* 965 (K, holo.!).

A further gathering was made nearby to the holotype by Mrs. Richards (*Richards* 9762!), and our new species has also been collected in the Poroto Mountains, but in Rungwe District, at Ngozi by Geilinger (Oct. 1932, *Geilinger* 2886 (K!) and by Mrs. Richards on a previous occasion (Oct. 1956, *Richards* 6485 (K!)).

In general appearance and in certain details all these examples clearly represent one taxon, the prominent nervature and pyramidal inflorescence (*when* well developed) being particularly indicative, but as is to be expected with brambles, there is variation in several features—(1) in the number of spreading stem hairs, which are sometimes dense and sometimes largely replaced by tomentum, (2) in the thickness of the leaf indumentum, which may be a matter of maturity, (3) in the size of the sepals, which in Michelmore and Geilinger's specimens are rather shorter and in *Richards* 9762 longer (–19 mm.) than those of the holotype, and (4) in the size of the petals which in *Richards* 9762 attain 11 × 10 mm.

R. porotoënsis scarcely resembles *R. apetalus*, as apart from having showy petals it lacks the pale, greenish-white tomentum on the undersurface of the leaves of the latter species. There is some resemblance to *R. keniensis*, particularly in the characters of the leaflets, but this latter invariably has trifoliolate leaves on the flowering branches (turions not seen). The nearest affinity appears to be to the variable *R. scheffleri*—a difficult bramble to understand conclusively—from which it differs in the distinctions offered above.

African Flora.*—The Origin of the African flora is a subject about which there has been much speculation supported by very little firm scientific evidence. It is the subject of Prof. Boughey's Inaugural Lecture given in the University College of Rhodesia and Nyasaland and those who listened to it must soon have realized the above fact. Boughey hastily covers a large field and an immense period of time. He deals with the origin of the angiosperms and supports Hutchinson's theory of their origin in the ancestral groups of Herbaceae and Lignosae, but adds "where we may search for evidence of the real existence of such hypothetical ancestral groups there is at present little clear indication". He mentions Wegener's hypothesis and describes the varied and numerous geographical and climatological changes that have occurred through the ages and which have resulted in the African continent that we know today. After touching on the tropical Cretaceous flora, also known as the Malayan flora, Boughey comes to the conclusion that the fossil evidence is of little help. He then discusses certain relict floras, such as that of New Zealand and of Madagascar, the Cape flora and even the Arctic flora, followed by an appreciation of Croizat's hypothesis. The last eight pages deal with the Evolution of Modern African Floras, and even here again one finds much speculation. The reader is left somewhat in a whirl, and the problem such as whether the genus *Erica* evolved in South Africa or in the north temperate zone remains apparently unsolved. There is a bibliography containing over forty references. E.M.-R.

* The Origin of the African Flora, Prof. A. S. Boughey, Oxford University Press, London. 48 pp. 4/6d.

Nomenclatural Notes: VII*

A. A. Bullock

A new generic name in Penaeaceae

It has been pointed out to me by Dr. F. A. Stafleu that the generic name *Sarcocolla* Kunth (1830) is a homonym of *Sarcocolla* Boehmer (1760), and it is necessary to decide whether the later homonym should be proposed for conservation or to coin a new name for it.

So far as has been ascertained all authors of both general and more specialized works have maintained the genus *Sarcocolla* Kunth as defined by that author. Stephens (Thiselton-Dyer, Fl. Cap. 5 (2): 94. 1915) included in it three species; Salter (Journ. S. Afr. Bot. 6: 41, 1940), on the basis of extensive field studies, considered that these should be reduced to a single species, a view with which Phillips (Gen. S. Afr. Fl. Pl. ed. 2. 525. 1951) concurred.

Sarcocolla Boehmer, on the other hand, has never been used by any other author. It was proposed in Boehmer's edition of Ludwig, *Definitiones Genera Plantarum* 11 (1760) as a return to the original name used by Linnaeus in the *Systema Naturae* (1735), which was changed to *Penaea* in the *Species Plantarum*, 111 (1753) and the *Genera Plantarum* ed. 5. 50 (1754). Boehmer's use of the name *Sarcocolla* was therefore illegitimate and was rightly ignored by later authors, but also unfortunately overlooked by Kunth.

There is no doubt that if the genus included several species, or had a wider distribution,—it is confined to south-western districts of the Cape Province,—or was of greater importance from any point of view, conservation would be desirable. In the circumstances, however, it seems more appropriate to coin a new name and I take the opportunity to rename the genus in honour of Captain T. M. Salter, R.N., who has done so much by example and precept to stress the importance of the study of living plants in the field in order to arrive at an understanding of their taxonomy.

Saltera *Bullock*, nom. nov. (*Penaeaceae*).

Sarcocolla Kunth, Linnaea 5: 677. 1830; non Boehmer in Ludwig, Def. Gen. Pl. [ed. 3] 11. 1760.

S. sarcocolla (*Linn.*) *Bullock*, comb. nov., sp. unica.

Penaea sarcocolla Linn. Sp. Pl. 111. 1753.

P. tetragona Bergius, Descr. Pl. Cap. 36. 1767.

P. squamosa Linn. Mant. Alt. 331. 1771; non Linn. Sp. Pl. 112. 1753, et ed. 2. 162. 1762.

Sarcocolla linnaei A. Juss, Ann. Sc. Nat. Sér. 3. 6: 25. 1846.

S. tetragona (Bergius) Salter, Journ. S. Afr. Bot. 6: 41. 1940.

It may be noted that Endlicher's (Gen. Pl. Suppl. 4 (2). 74. 1847) *Sarcocolla squamosa* was in fact based upon *Penaea squamosa* Linn. (1753) and not upon *P. squamosa* Linn. 1771, although, as Salter (*l.c.*) pointed out, he evidently

* Continued from Kew Bull. 1958: 108. 1958.

intended the latter plant. Bergius (1767) described *Penaea tetragona* as a new species and this name is no more than a taxonomic synonym of *P. sarcocolla* Linn., the earliest nomenclatural synonym of the latter under *Sarcocolla* Kunth (1830) being *S. linnaei* A. Juss. (1836). Although he described the genus, Kunth did not make any specific transfers to it.

The Flora of Wiltshire.*—A passing glance at Stonehenge, and then an endless vista of road flanked by vast, dry, featureless plains, with occasional glimpses of some huge and hideous army edifice in the middle distance—these, together with dust and diesel fumes, are the lasting impressions many of us carry away from Wiltshire as we scud over the highways towards the promised lands of Dorset, Somerset, Devon or Cornwall. It is probably a grossly distorted picture of the county, and yet as one scans the pages of this admirably detailed and accurate volume, one cannot help feeling that the same unbounded featurelessness stamps the flora of the region. Everything is present that should be present, there are few surprises and even fewer anomalies—what we expect to be common *is* common, and what we expect to be rare *is* rare—yet in a county where the wide open spaces are so evident and so generally unspoilt, one might have hoped for a modicum of the unanticipated. This is not to say that the Wiltshire flora is a poor one; on the contrary it is, for a land-locked county, just about as rich and varied as one could reasonably wish it to be—but the element of surprise is lacking, and to the botanical pilgrim that is a serious defect.

Perhaps this absence of surprise is in fact a veiled tribute to the thoroughness and exactness of Mr. Grose's work—there are very few 'probablies', 'possiblies' or 'likelies' in this book. One feels that the ground has been covered square yard by square yard, and that no flower however shy or blushing has escaped the scrutiny of the county's botanical investigation department.

The Flora itself is a model for aspiring editors, with nothing amiss, and little omitted—though, in this connection, it is perhaps a pity that the numerous abbreviations and reference symbols which appear in the text could not have been explained at one place in the introduction, and not on several separated pages. It would also have been nice to know more about the distribution of Wiltshire plants in adjacent counties. And, if I may be allowed a suggestion, surely it would be better to illustrate local Floras with photographs of landscapes rather than with close-up studies of individual rarities. After all we can see what most British plants look like in a fairly wide range of publications, and in a county Flora we would like to see the county—the habitat rather than the herb. These minor shortcomings are more than balanced by the wealth of information on local ecology and plant populations, on geology and climatology, botanical history and popular plant-names. Such charming inventions as 'Shame-faced Maiden' (for *Anemone nemorosa*), 'Granny-jump-out-of-bed' (for *Aconitum anglicum*) and 'Babes in a Cradle' (for *Scrophularia aquatica*) suggest that the scurrying visitor may have failed to sense the poetry that haunts those bare, unsheltered plains.

R. D. MEIKLE.

* The Flora of Wiltshire. By Donald Grose. Devizes: The Natural History Section of the Wiltshire Archaeological and Natural History Society, 1957. Pp. 824. Price 42/-.

Notes on Tephrosia in Tropical Africa

J. B. Gillett

Square brackets in descriptions indicate information not drawn from the type specimen. All specimens cited have been seen, except those enclosed in brackets, and are in the Kew herbarium unless otherwise indicated.

A Species with the style glabrous except for the tip and the base (1–14 except No. 6).

A[1] Flowers axillary.

1. **T. lathyroides** *Guill. & Perr.*, Fl. Seneg. Tent. 1: 193 (1832).

Described from a single incomplete fruiting specimen gathered at Dakar on the Cape Verde peninsula, Senegal. What appears to be the type is at the British Museum; no type material could be found in a prolonged search of the Paris Herbarium in Sept. 1957.

This name has been interpreted in three conflicting ways.

(a.) by J. G. Baker, Fl. Tr. Afr. 2: 118 (1871) doubtfully, Andrews, Fl. Sudan 2: 236 (1952) (without doubt), and Cufodontis, Bull. J. Bot. Et. Brux. 25: 284 (Enum. Pl. Aeth.) 1955 as an earlier name for *T. anthylloides* Hochst. ex Webb (1850), [ex Bak. (1871)]. Since *T. anthylloides* is now universally considered to be conspecific with *T. uniflora* Pers. (1807) *T. lathyroides* is, on this view, a synonym for *T. uniflora.*

(b.) by E. G. Baker, Leg. Tr. Afr. 185 (1926), following manuscript notes in the Kew Herbarium by J. R. Drummond, as the correct name for *T. cordofana* Hochst. (nomen). In the present author's opinion *T. subtriflora* Hochst. ex Bak. (1871) and *T. pauciflora* Graham ex Bak. (1876) are conspecific with *T. cordofana.* If view (b.) is correct *T. lathyroides* would be the correct name for this species.

(c.) by Berhaut, Fl. Seneg. 49 (1954) as the correct name for a plant which, on the customary broad view of *T. purpurea* (L.) Pers., would be regarded as a form of *T. purpurea* var. *pubescens* Bak.

Arguments for view (a.)
(1) The type of *T. lathyroides* shows only an axillary flower, as in *T. uniflora.*
(2) The leaflets are "cinereo-sericeis" above, as often in *T. uniflora.*
(3) *T. uniflora* is known to occur in Senegal.

against *T. lathyroides* has 5–6 seeds, *T. uniflora* in W. Africa 9–13 seeds in each pod.

for view (b.)
(1) Like *T. uniflora*, *T. subtriflora* has only axillary flowers.
(2) *T. subtriflora* has 5–9-seeded pods.

against

(1) Leaflets glabrous above in *T. subtriflora* (a single exception has been seen, from Sind).

(2) No specimens of *T. subtriflora* have yet been seen from Senegal; (the species does, however, occur in the Cape Verde Islands).

(3) The type of *T. lathyroides* is darker than is usual in *T. subtriflora*.

for view (c.)

(1) Pods 6–9-seeded in *T. purpurea*.

(2) Leaflets usually pubescent above in *T. purpurea* var. *pubescens*.

(3) *T. purpurea* var. *pubescens* is known to occur in Senegal.

(4) The dark colour of the type of *T. lathyroides* is common in *T. purpurea* var. *pubescens*.

against. Most of the flowers of *T. purpurea* are in racemes; the fruit in the type of *T. lathyroides* is axillary. However axillary flowers are usually also present in *T. purpurea* below the raceme and incomplete plants may show these axillary flowers only.

To sum up: the balance of probability is that Berhaut's interpretation of *T. lathyroides* is correct. Whether he is correct in considering it specifically distinct from *T. purpurea* and if so whether it is also specifically distinct from *T. lineata* Sch. & Thonn. (1827) are other questions. Alternatively *T. lathyroides* may be regarded as a *nomen ambiguum*. It is probably incorrect and certainly unwise to follow Drummond and E. G. Baker and identify it with *T. subtriflora* (*T. cordofana*).

2. **T. subtriflora** *Hochst. ex Bak.*, Fl. Tr. Afr. 2: 117 (1871).

T. cordofana Hochst. in Sched., nomen.

T. pauciflora Graham ex Bak., Fl. Br. Ind. 2: 114 (1876) mostly.

T. encoptosperma Schweinf., Bull. Herb. Boiss. 4: app. 2: 246 (1896).

T. graminifolia Chiov., Ann. di Bot. 13: 381 (1915).

T. multiflora Blatter & Hallberg, J. Bombay Nat. Hist. Soc. 26: 239 (1918).

T. lathyroides sensu Bak. f., Leg. Tr. Afr. 185 (1926) non Guill. & Perr.

T. sulphurea Chiov., Fl. Somala 1: 142 (1929).

YEMEN: near Jeddah, *Trott* 251, 1313.
W. PAKISTAN: near Karachi, *Stocks* 416. etc.
INDIA: Rajasthan, Jaisalmer, *Blatter & Hallberg* 6974 BLAT, type of *T. multiflora*.
BURMA: Paghamew on Irrawaddy, c. 21° 15′ N., 25.9.1826, *Wallich* 5635, type of *T. pauciflora*.
CAPE VERDE ISLES: *Bolle* s.n.; *Chevalier* 45803; etc.
FR. NIGER COL.: Baguezane Mts., 8° 30′ E., 17° 45′ N., *Buchanan* s.n. BM.
SUDAN REPUBLIC: Cordofan, 1839, *Kotschy* 181 type of *T. cordofana*; Suakin-Berber 1868, *Schweinfurth* 667; Gezira, *Andrews* 75; etc.
ERITREA: *Gilliland* 4051, 4064; Saati 15–18.2.1892, *Schweinfurth & Riva* 319 isosyntype of *T. encoptosperma*.
ETHIOPIA: mountains near Goelleb, 1,000 m., 29.8.1854, *Schimper* 2312 holotype; Ogaden, Bulle Sirauw, *Glover & Gilliland* 454.
BRIT. SOMALILAND: Saad ud din island near Zeilah, *Drake Brockman* 916.
SOMALIA: Webi Scebeli, *Paoli* 1320, type of *T. graminifolia*; Obbia, Magghiole, *Puccioni & Stefanini* 473, type of *T. sulphurea*.
SOCOTRA: *Balfour* 677.
KENYA: Northern, Central, Masai and Coast provinces.
TANGANYIKA: Northern, Tanga and Central provinces.
ANGOLA: Huilla, *Exell & Mendonca* 2466 COI.
MADAGASCAR: specimen at Paris.

Throughout its range this species has been confused with *T. uniflora*. Its more or less annual habit and usually more numerous rather narrower leaflets are useful characters in separating it from that species, and the seeds are usually less numerous than in *T. uniflora* ssp. *uniflora*. However the decisive characters are those of the style and stigma and the proportion of claw to blade in the lower petals (see fig. 1).

T. subtriflora is very variable in the indumentum, size, number and shape of the leaflets. However, in the limited material at our disposal there seems to be insufficient correlation among these characters to justify the establishment of infra-specific taxa at the present time. The first leaves on a young plant are often 1-foliolate and the next few-foliolate and in arid areas the plant may often flower, fruit and die in this state, while under more humid conditions plants continue their growth and may produce leaves with up to 13 leaflets, thus appearing very different. *T. encoptosperma* is a plant with few and relatively broad leaflets. *T. graminifolia* has few (1–3) very long and narrow leaflets, a sparse indumentum and unusually large flowers. In the first respects it is approached by *Glover and Gilliland* 454 and *Gillett* 12985 from N. Kenya. However these plants have unusually *small* flowers. It is also approached by *Graham* 1997 from Kenya coastal province but this plant has up to 7 leaflets.

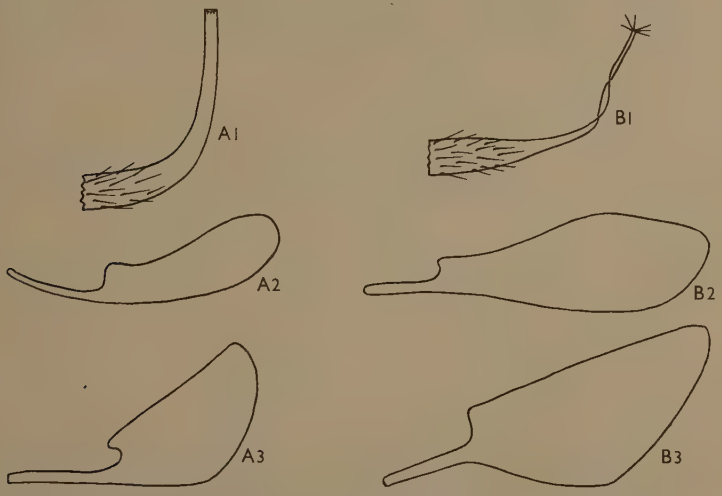


FIG. 1. A. *Tephrosia subtriflora*, *B. T. uniflora*. 1. style × 10, 2. ala × 6, 3. carina × 6. A. from *Dümmer* 5023, Kibwezi, Kenya. B. from *Gillett* 13101, Dandu, N. Kenya.

The variability of *T. subtriflora* is greatest in N.E. tropical Africa and much less in other parts of its range. The species is known by single specimens from Burma, Angola and Madagascar, and by a few from the Cape Verde Islands; each of these localities being separated by great distances from the nearest point where the species occurs. Andrews in the Sudan and Milne-Redhead and Taylor in Kenya record it as a weed of cultivation, which may in part account for these discontinuities of distribution.

3. **T. uniflora** *Pers.*, Syn. Pl. 2: 329 (1807).

α ssp. **uniflora.**

T. anthylloides Hochst. ex Webb, Kew J. Bot. 2: 345 (1850).

T. uniflora Pers. var. *parvifolia* Bak. f., Leg. Tr. Afr. 184 (1926).

T. transjubensis Chiov., Fl. Somala 2: 161 (1932).

Cape Verde Islands. Senegal: *Roussillon* s.n. in herb Lamarck P holotype. Fr. Sudan; N. Nigeria; Sudan republic: *Kotschy* 87, 111 syntypes of *T. anthylloides*; Eritrea: Keren, *Pappi* 358, type of var. *parvifolia*; Ethiopia: 1841, *Schimper* 1614, syntype of *T. anthylloides*; Somalia: *Gorini* 49 FI, 50 FI, 51 FI, 52 FI, syntypes of *T. transjubensis*; Kenya; Tanganyika; Angola; S. Rhodesia; N. Transvaal.

β ssp. **petrosa** (*Blatt. & Hall.*) *Gillett & Ali* stat. nov.

T. pauciflora Graham ex Bak., Fl. Br. Ind. 2: 114 (1876) pro minore parte, non quoad typum.

T. petrosa Blatter & Hallberg, J. Bombay N.H.S. 26: 239 (1918).

Blatter and Hallberg l.c. described two species of *Tephrosia* from the Indian Desert, *T. multiflora* and *T. petrosa*, whose syntypes are preserved at Bombay. Recently Mr. S. I. Ali, while working at Kew on the Leguminosae of W. Pakistan has shown that *T. pauciflora* Graham ex Bak. consists of two species, distinguishable by their styles and stigmas and the dimensions of their petals. By the courtesy of Professor Santapau it has been possible to examine Blatter's types and it appears that *T. pauciflora* s. str. is conspecific with *T. multiflora* while the other constituent in *T. pauciflora* s. lat. is *T. petrosa*. *T. pauciflora* s. str. is also conspecific with *T. subtriflora* Hochst. ex Bak. (1871) and this seems the correct name for that taxon. *T. petrosa* is conspecific with Arabian plants which have been named *T. uniflora* Pers. (1807). However there are certain differences, summarised below, between *T. petrosa* from Arabia, W. Pakistan and India on the one hand and typical *T. uniflora*, as found in most of the drier parts of Tropical Africa, on the other.

	petrosa	*uniflora*
(a.)	Indumentum of pod, pedicels and calyx closely appressed.	This indumentum more or less spreading.
(b.)	Leaflets very rarely more than 5.	Leaflets often up to 7, sometimes 9.
(c.)	Seeds 5–8, rarely 9.	Seeds 9–14.
(d.)	Pod 3–5 cm. long.	Pod 5–6 cm. long.

In N.E. Tropical Africa and the Red Sea coast of Arabia plants occur which combine the characters of *petrosa* and *uniflora*. These facts seem best summarised by treating *petrosa* as a subspecies of *T. uniflora*. The epithet *uniflora* is equally misleading for both subspecies, which, like nearly all other species of *Tephrosia*, seem always to have at least two flowers per node. In ssp. *petrosa* and intermediates between this and ssp. *uniflora* the terminal flowers of a branch are sometimes in the axils of bracts instead of normal leaves, forming a very short raceme. This has not been observed in ssp. *uniflora*.

Hejaz: near Jeddah, *A. C. Trott* 137, 1528, 1529, 1530, 1531, 1533; *D. Vesey-Fitzgerald* 15296/6 BM, 16720/6 BM; *Philby* s.n. BM.

Aden: *Dent* 62, *Birdwood* 170, *Burtt Davy* 22789.

W. Pakistan: Sind, near Karachi, *Stocks* s.n. and 454, *Stearn* 15; N.W. Frontier Prov., Thal, *Aitchison* 522.

India: Rajasthan, Jaisalmer, *Blatter* 6970 (BLAT lectotype) K photo, *Blatter* 6969 (BLAT syntype) K photo, etc.

The following specimens are intermediate between sspp. *uniflora* and *petrosa*.

Hejaz: Jeddah, *Ehrenberg* s.n., *Trott* 1532.
Sudan Republic: Coast Province, *Shabetai* F.1733, *Bent* s.n.
Eritrea: *Steudner* 85, *Schweinfurth & Riva* (1892) 287.
Brit. Somaliland: *Gillett* 4319.
Somalia: Nogal Basin, *Puccioni & Stefanini* 866 FI.
S. Ethiopia: N. of Lake Rudolph, *Corradi* 3924 FI, 4496 FI, 4498 FI, 4499 FI.
Kenya: Turkana Prov., *Martin* 50, *Padwa* 187.

4. **T. schweinfurthii** *Deflers*, Bull. Soc. Bot. Fr. 42; 302 (1895).

T. simplicifolia Franch. in Revoil, Faune et Flore des Pays Çomalis 28 (1882), non F. Muell. ex Benth. (1864).

T. franchetii Hutch. & Bruce, Kew Bull. 1941: 117.

Aden protectorate: (Wadi Moaden [Bilad Soubaihi], May 1894, *Deflers* 1149 ?P? type); 96 km. N.W. of Mukalla, c. 48° 30′ E., 6.9.1949, *K. Guichard* HAD/55 BM.
British Somaliland: (without locality *Revoil* s.n. P type of *T. simplicifolia* Franch. and *T. franchetii*). Watershed at 1000–1500 m. from c. 43°–49° E., *Bally* 9880, *Gillett* 4053, *Appleton* s.n., *Audy* s.n. EA, *Drake Brockman* 184, *Bally* 10940.

The authorities at Paris, when kindly loaning other Deflers specimens for examination at Kew, were unable to trace the type of *T. schweinfurthii*. However Mr. Guichard's specimen proves that the present very distinct species occurs on both sides of the gulf of Aden and there can be no doubt, from the description, that it is to it that Deflers' name applies. The flowers in this species are often single at each node, which is very unusual in *Tephrosia*, but they do sometimes occur 2 or 3 together. I am much indebted to Miss Hillcoat of the British Museum for drawing my attention to Mr. Guichard's plant.

A² Flowers in terminal racemes: often some axillary as well.

5. **T. paniculata** *Welw. ex Bak.* var. **schizocalyx** (*Taub.*) *Gillett* stat. nov.

T. schizocalyx Taub., Eng. Bot. Jahrb. 23: 183 (1896).

Leaves usually 1-foliolate, occasionally some of them 3-foliolate, instead of 3- to 5-, rarely 1-, foliolate as in var. *paniculata*. This variety is apparently confined to Southern Tanganyika and Nyasaland while var. *paniculata* is widespread in tropical Africa.

6. **T. hockii** *De Wild.* ssp. **hirsutostylosa** (*Dewit*) *Gillett* comb. nov.

T. aurantiaca Harms ssp. *hirsutostylosa* Dewit, Bull. Soc. Bot. Belg. 84: 79 (1951).

Northern Rhodesia: Western Province: Mwinilunga district: Matonchi farm, 5.10.1937, *Milne-Redhead* 2591 holotype and, 18.2.1938, 2591/A (young fruit). Copper belt: Chingola, 26.8.1954, *Fanshawe* 1489; Kitwe, 7.10.1955, *Fanshawe* 2494 (flowering) and 2495 (very young fruit); Mufulira, 3.1.1956, *Fanshawe* 2685 (young fruit).

Mlle. Dewit l.c. clearly demonstrated the great variability in length of calyx lobes and leaflet dimensions to be found in the group of *Tephrosiae* to which this plant belongs. She therefore treated *T. aurantiaca* Harms (1900), the oldest name to be applied to any member of the group, in a very broad sense, including in it as subspecies, varieties and forms, *T. verdickii* De Wild. (1903), *T. hockii* De Wild. (1913), *T. lutea* R. E. Fries (1914), *T. rhizomatosa* De Wild. (1925) as well as our present plant and other recently collected specimens. To be logical, once so broad a view is taken, *T. katangensis* De Wild. (1903) should also be included in *T. aurantiaca* Harms s. lat.

It was apparently omitted because its wings and keel are said, with some doubt, to be purple.

T. aurantiaca s. lat. is undoubtedly a very natural group, distinguished by its perennial rootstock; rather large leaflets 3–11 in number, glabrous above, with rather wide spaces between the chief lateral nerves and a very prominent network of nervules connecting them; large, always (or nearly always) orange flowers; the keel pubescent at the suture (De Wildeman's statement that the keel is glabrous in *T. rhizomatosa* is an error); stout penicillate style, glabrous except in the present plant, and 6–8 ovules. The seeds are probably longitudinal and carunculate but mature seeds have not yet been seen.

Dr. Cronquist is the Flore du Congo Belge 5: 90–93 (1954) disagrees with Mlle. Dewit's treatment of this group, taking a much narrower view of the species. He treats *T. katangensis*, *T. verdickii*, *T. hockii* as distinct species from *T. aurantiaca* (which he restricts to the type alone) and elevates to specific rank as *T. subpraecox* Cronq. a plant which Mlle. Dewit described as *T. aurantiaca* ssp. *hockii* var. *longifolia* Dewit. He treats *T. lutea* and *T. rhizomatosa* as synonyms for *T. hockii* and says nothing about ssp. *hirsutostylosa* which is unknown from the Congo.

Since Dr. Cronquist's work, Kew has received, besides Mr. Fanshawe's specimens of ssp. *hirsutostylosa* cited above, some half dozen specimens of *T. aurantiaca* s. str., which previously was known from the type only, collected by Mr. A. A. Bullock and Mrs. H. M. Richards in the Abercorn district of N. Rhodesia and the Ufipa district of Tanganyika. Thanks to the kindness of Prof. Robyns in lending the bulk of the Congo specimens in Brussels it has been possible to compare this greatly increased material of *T. aurantiaca* and ssp. *hirsutostylosa* with the Congo material. As a result three conclusions emerge (1) A great deal more material is needed, particularly of ripe fruits and seeds, which have not yet been seen, before any firm conclusions can be reached. (2) There seem to be a series of rather slight differences between typical *T. hockii* and *T. aurantiaca* which justify their retention for the present as distinct species. (3) The difference between ssp. *hirsutostylosa* and *T. hockii* is very slight, consisting of one character the pubescence of the style, and a different distribution only, while ssp. *hirsutostylosa* is just as different from *T. aurantiaca* as *T. hockii* itself is. It may seem unsuitable to base a subspecies on a single character, the style pubescence, but this character is so important in classifying *Tephrosia* that it is useful to make the distinction here. The differences between *T. hockii* and *T. aurantiaca* are as follows:

	T. hockii	*T. aurantiaca*
(a)	Indumentum of stem and leaf rhachis short, not very dense, appressed, silvery.	This indumentum dense, rather fulvous, fuzzy.
(b)	Petiole up to 4 cm. long.	Petiole not above 15 mm. long.
(c)	Leaflets up to 10 cm., commonly over 6 cm., long, sparsely pilose below, chiefly on the nerves.	Leaflets not above 6·5 cm. rarely so much as 6 cm. long, densely silvery below.
(d)	Some flowers in leaf axils as well as in dense terminal or axillary racemes.	No flowers in leaf axils.

(e)	Racemes subsessile, or, at least, longer than the peduncle.	Racemes often shorter than the peduncle.
(f)	Indumentum of flowers and inflorescences silvery or slightly fulvous.	Indumentum of flower, and inflorescences silvery, fulvous, brown or blackish.

Of the specimens treated as *T. hockii* by Cronquist, which I have examined, *Hock* s.n. (the type), *Mortelmans* 2 and 25 and *Quarré* 1496 are typical, as described above. *Homblé* 813, *Quarré* 7525 and *Quarré* 5890 diverge in one or two characters towards *T. aurantiaca*. *Cabu* 90 is almost intermediate between the two, and also seems to show some relationship to *T. katangensis*, *T. verdickii* is more closely related to *T. aurantiaca*, of which it might be considered to be a subspecies, than to *T. hockii*.

7. **T. richardsiae** *Gillett* n. sp.

T. cephalophorae Harms affinis: indumento breviore, foliolis latioribus, retusis, numerosioribus, stipulis brevioribus, floribus saepe in axillis foliorum superiorum dispositis, differt.

Suffrutex c. 1 m. altus, annuus vel per annos paucos perennans, caulibus dense argenteo- vel flavo-villosis, pilibus appressis vel patentibus, ad 1 mm. longis. *Foliorum rhaches* ad 6 cm. longae, petiolo ad 1 cm. longo incluso, ultra foliola lateralia 0–2 mm. prolongatae; stipulae anguste triangulae, ad 7 mm. longae; foliola 7–15, cuneato-oblonga, apice retusa, ad 4 cm. longa et 9 mm. lata, supra glabra, infra argenteo-sericea, nervis principis utrinque 6–9. *Flores* aurantiaco-purpurei, in racemis terminalibus brevibus, sessilibus, subcapituliformis, et quoque in axillis foliorum superiorum dispositi; pedicelli c. 5 mm. longi; bracteae anguste triangulae c. 5 mm. longae. *Calyx* argenteus, tubo 2 mm. longo, lobis lanceolato-acuminatis, ad 5 mm. longis, superioribus paulo brevioribus, fere ad basin inter se liberis. *Vexillum* extus flavo-sericeum, interne purpureum [12]–15 mm. longum, ungue 2–3 mm. longo incluso, lamina oblonga. *Alae* glabrae, purpureae. *Carina* sensim rotundata, glabra, aurantiaco punctata. *Filamentum* vexillare alios adhaerens, 1·5 mm. supra basin dilatatum et inflexum, haud callosum. Filamentorum aliorum pars connata [9]–11 mm. longa, pars libera 3–4 mm. longa; antherae 0·7 mm. longae. *Ovarium* dense villosum, stylo glabro, sensim curvato, attenuato, ad 8 mm. longo, apice penicillato. *Legumen* horizontale, dense argenteo-brunneo-tomentosum, versus apicem paulo sursum curvatum, styli basi persistente tomentosa, valide deflexa, ad 4 cm. longum et c. 4 mm. latum. *Semina* 6–9, ovoideo-oblongata, longitudinalia, bene inter se separata, 3 mm. longa, 2 mm. lata, 1·2 mm. crassa, minime carunculata, hilo excentriale.

Tanganyika: Ufipa district, Kasamvu–Lake Kwela, 1620 m., plateau grassland with scattered trees, erect bushy herb, flowers orange, 21.3.1950, *Bullock* 2702. Iringa district, Iringa, 10.4.1933, *Staples* 267; 20.5.1935, *Emson* 507; 26.6.1936, *Emson* 545.

N. Rhodesia: Lake Tanganyika, near Mpulungu, 840 m., in bush by road, flowers dull pink, 8.3.1952, *Mrs. Richards* 1079, holotype. Kalambo falls, path to village, 1500 m., open sandy red soil, spreading bushy plant 25–35 cm. tall, flower bright yellow, 29.3.1955, *Mrs. Richards* 5264. Nsama 29° 58′ E., 8° 52′ S., 1200 m., sandy soil, flowers bright orange, the standard brown outside, 4.4.1957, *Mrs. Richards* 9012. Serenje, plateau woodland, subshrub or woody herb up to 1 m., flowers orange-pink, 18.2.1955, *Fanshawe* 2091. Koloswe 62 km. S.W. of Mpika, 1200 m., shrublet 70 cm. tall, 24.7.1930 (with immature fruit) *Hutchinson & Gillett* 4064.

8. **T. linearis** (*Willd.*) *Pers.*, Syn. Pl. 2: 330 (1807).

Galega linearis Willd. in Linn. Sp. Pl. ed. 4, 3: 1248 (1803).

Type: "Guinea" *unknown collector* (B, holo.).

Botanists working on the flora of Tropical Africa have, until recently, often taken a rather wide view of *T. linearis*, including in it plants which Dr. Cronquist in the Flore du Congo Belge 5: 95 (1954) keeps separate as *T. discolor* E. Mey. Dr. Cronquist uses characters a–d as tabulated below to separate *T. discolor* from *T. linearis* s. str., which also occurs in the Belgian Congo. A further three characters, e–g may also be used.

	T. linearis	*T. discolor*
(a)	Annual.	Perennial.
(b)	Vexillar filament free.	Vexillar filament lightly attached, at least near the base, to the sheath formed by the other 9 filaments.
(c)	Calyx 2·5–4 mm. long.	Calyx 4–7 mm. long.
(d)	Standard 5–8·5 mm. long.	Standard 7·5–12 mm. long.
(e)	Anthers c. 0·3 mm. long.	Anthers c. 0·6 mm. long.
(f)	Style 1·5–2·1 mm. long.	Style 2–3 mm. long.
(g)	Occurring from 0–1400 m. above sea level.	30–2400 m. above sea level.

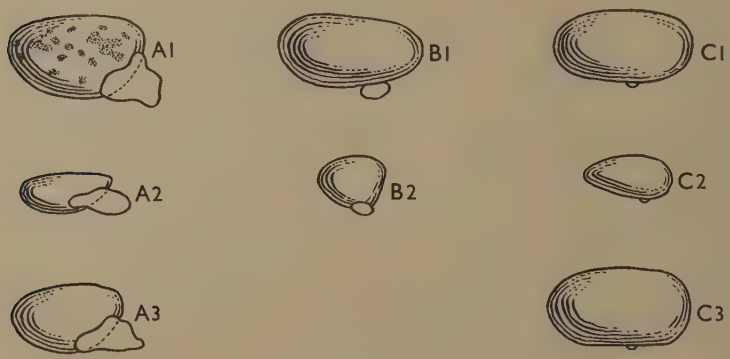


FIG. 2. Seeds of *Tephrosia* spp. × 8. A.1. *T. linearis* ssp. *linearis*, *Moiser* 33, N. Nigeria. (note: mottled seeds are sometimes found in this species but have not been observed in the other two). A.2. *T. linearis* ssp. *linearis* (immature), *Ankrah in G.C.* 20187, Ghana. A.3. *T. linearis* ssp. *discolor Becquet* 581, Kagera, Eastern B. Congo. B.1. *T. decora*, *Milne-Redhead & Taylor* 10826, Songea district, Tanganyika. B.2. *T. decora* (immature), *Pedro & Pedrogao* 3465 EA, Vila Cabral div. Port. E. Africa. C.1. *T. argyrotricha*, *Pedro & Pedrogao* 3389 EA, Amaramba div. Port. E. Africa. C.2. *T. argyrotricha* (immature), *Burtt* 6444, Mwanza district, Tanganyika. C.3. *T. argyrotricha* var. *burtii*, from the type.

It is apparent that most of the characters overlap and in fact, in areas such as Uganda and the Lake Province of Tanganyika where both taxa occur a high proportion of the specimens are more or less intermediate, combining the characters of the two taxa. The position is made more difficult by the failure of most collectors to preserve the roots or to note whether their plants are annual or perennial. The matter requires careful research in the field and for the present the treatment of *T. discolor* as a subspecies of *T. linearis* seems

the most practical solution. The carunculate seeds (fig. 2, A 1–3) are most useful in recognising the species as a whole but offer no help in distinguishing between the two sspp.

Synonymy and geographical distribution of the 2 sspp.

α ssp. **linearis**

T. linearis (Willd.) Pers. sensu Bak., Fl. Tr. Afr. 2: 120 (1871); Hutch. & Dalziel, Fl. W. Tr. Afr. 1: 385 (1928); Robyns, Fl. Parc Nat. Alb. 1: 308 t. 28 (1948); Cronquist, Fl. Congo Belge 5: 95 (1954).

T. pulchella Hook. f., Fl. Nigr. 299 (1849).

T. seminuda Bojer ex Bak., J. Bot. 20: 68 (1882).

West Tropical Africa; Fr. Congo; B. Congo; Oubangui; Sudan republic; Uganda: U 1, 3, 4; Kenya: K5?; Tanganyika: T 1, 3, 4, 6, 7; Zanzibar; Nyasaland: *Buchanan* 596; N. Rhodesia: *Mrs. Richards* 4802; Angola: *Welwitsch* 2101. Madagascar: *Bojer* s.n. type of *T. seminuda*, etc.

β ssp. **discolor** (*E. Mey.*) *Gillett* stat. nov.

T. discolor E. Mey., Comm. Pl. Afr. Austr. 111 (1836); Forbes, Bothalia: 4 969 (1948); Cronquist, Fl. Congo Belge 5: 95 (1954).

[*T. longipes* sensu Bak., Fl. Tr. Afr. 2: 120 (1871) non Meissn.]

B. Congo; Oubangui (fide Cronquist l.c.); Sudan repub.: Equatoria, Yambio-Tambura, *Myers* 6996; Ethiopia: W. shore of Lake Zwai, *Welby* s.n.; Uganda: U 1–4; Kenya: K 3–5; Tanganyika: T1, Karagwe, *Grant* 487, T 2–4, 6, 7; Port. E. Africa: *Faulkner* 153; Nyasaland: Nyika plateau, *McLounie* s.n., Milanje *Whyte* s.n.; S. Rhodesia: N. Rhodesia: *Mrs. Richards* 566, 4411, 7956; Transvaal: Lions Creek, *Schlechter* 12208; Natal: Port Natal, *Drège* s.n. isotype.

9. **T. decora** *Welw. ex Bak.*, Fl. Tr. Afr. 2: 123 (1871).

T. delicata Bak. f., Leg. Tr. Afr. 192 (1926).

Tanganyika: Mbeya district, *R. M. Davies* 81 K, EA; 108 K, EA; 364 K, EA; 452 K, EA; 550 K, EA; 616 K, EA. Songea district, *Stenhouse* 4 K, BM, EA; *Milne-Redhead & Taylor* 9142 K, EA, BR; 9206 K, EA, BR, B, LISC, SRGH; 10826 K, EA (with seeds).

Port. E. Africa: Vila Cabral Div., *Pedro & Pedrogao* 3548 EA; 3465 EA (young seeds); Mandimba, *Pedro & Pedrogao* 3403 EA (with seeds).

Nyasaland: *Buchanan* 376 (with seeds); 979; *Exell, Mendonça & Wild* 900 BM.

S. Rhodesia: *Whellan* 1176; *Dehn* 743/52; *Rand* 21 K, BM (with seeds); Umtali Div., Odanzi river valley *Teague* 436 pp. (type of *T. delicata*).

N. Rhodesia: *Mrs. Richards* 4971; *Fanshawe* 113 (with seeds); *Milne-Redhead* 570 (young seeds); 931 (young seeds); 4528; 4631; *Cruse* 490; *Exell, Mendonça & Wild* 1417 BM.

Angola: Pungo Andongo, Lombe-Candumba, *Welwitsch* 2098 K, BM, P, COI (type); *Gossweiler* 9620 BM; 4280 BM, COI; *Welwitsch* 2099 COI; *Anchieta* 29 COI; *Carisso & Sousa* 67 COI (with seeds); *Exell & Mendonça* 1419 COI; Faulkner A2 (young seeds); A 196; A 196/A.

Wherever it has been possible to examine the seed this has shown the characteristic annular caruncle shown in fig. 2, B. This is entirely distinct both from the minute, almost non-existent, caruncle seen in *T. coronilloides*, *T. purpurea* and *T. argyrotricha* (fig. 2, C) and from the enlarged caruncle appressed to one end of the seed characteristic of *T. linearis*, *T. elegans* and *T. tanganicensis*. With a little practice it is possible to detect this caruncle even in immature seeds of *T. decora*. It is particularly desirable that fruiting material with ripe seed should be obtained from the area of the type gathering of *T. decora* as this is a stout plant larger in all its parts than most of the other specimens cited above, and agreeing really well only with *Gossweiler* 9620 and *Milne-Redhead* 4631 both of which also do not show seeds. *Teague*

436K, the type of *T. delicata* is a mixture of a flowering specimen of the present species and a fruiting specimen of *T. purpurea* (L.) Pers. var. *pubescens* Bak.

10. **T. coronilloides** *Welw. ex Bak.*, Fl. Tr. Afr. 2: 123 (1871).

T. longana Harms, in Warburg & Baum, Kunene-Sambesi Exp. 259 (1903).

T. pallens Pers. var. *angolensis* Bak. f., Leg. Tr. Afr. 191 (1926).

N. Rhodesia: Barotseland: Sesheke district, 16 km. W. of Kalima, on sand, *White* 2001 FHO (young seed).

Angola: Cassuango-Cuiriri, *Gossweiler* 3681 COI, BM (type of *T. pallens* var. *angolensis*). Cuanza, Condo cataract 1000 m., *Gossweiler* 11857 COI. Longa above Napalamba, 1130 m. on sand, *Baum* 612 K, BM, COI (young seed), isotypes of *T. longana*. Pungo Andongo, Cuanza river near Sansamanda on sand *Welwitsch* 2080 K, BM, COI (type).

This species is closely related to *T. decora*, from which it differs as follows.

T. decora	*T. coronilloides*
Annual.	Perennial.
Leaflets usually glabrous above; sometimes as many as 19, but usually 7–18.	Leaflets pubescent above; 13–23 in number.
Beak of pod curved slightly downward.	Beak of pod curved very sharply downward.
Seeds with a marked annular caruncle.	Seeds almost ecarunculate.

Welwitsch 2081 BM identified as *coronilloides* by Hiern, Cat. Welw. Afr. Pl. 1: 224 is *T. uniflora* Pers. Further material of this species, especially of mature fruits with seeds and of the rootstock is needed. The statement that it is a perennial at present depends solely on Mr. White's specimen and notes. It is worth remarking that plants of *T. decora* with leaflets pubescent above e.g. *Faulkner* A/196, A/196/A and *Fanshawe* 113 have only been seen from Angola and Western Northern Rhodesia, the area where *decora* and *coronilloides* both occur, suggesting that introgression may take place.

11. **T. argyrotricha** *Harms* in Kuntze, Rev. Gen. 3: 2: 57 (1898).

Cracca argyrotricha (Harms) Kuntze ibid.

α var. **argyrotricha.**

Tanganyika: Mwanza district, *Burtt* 6444 K; Tabora, *F. G. Smith* 1112 K, EA; Songea district, *Milne-Redhead & Taylor* K, EA, BR, B, LISC, SRGH, S. Lindi district, 150 km. W. of Lindi *Schlieben* 6423 BM.

Port. E. Africa: Niassa Province, Tapala, *Pedro & Pedrogao* 3288 EA; Cuamba-Minhomar, *Pedro & Pedrogao* 3389 EA; Mozambique, 5 April 1894, *O. Kuntze* s.n. K (NY) isotypes.

β var. **burttii** (*Bak. f.*) *Gillett* stat. nov.

T. burttii Bak. f., J. Bot. 71: 341 (1933).

Differs from var. *argyrotricha* in the leaflets being inrolled and shortly pubescent above.

Tanganyika: Tabora district, *Van Rensburg* 57 EA; *Bally* 8294 K; Dodoma district, *Burtt* 4001 BM holo, K, EA iso.

This species has until now been little understood; the excellent material recently received permits it to be distinguished with some certainty from *T. linearis* (Willd.) Pers. and *T. decora* Welw. ex Bak., at least when seeds are available (see fig. 2C, 1–3).

12. **T. angulata** *E. Mey.*, Comm. Pl. Afr. Austr. 109 (1836). Type: Eastern Cape Prov., near Glenfilling, *Drège* s.n., K, iso.

Galega humilis Thunb. Prod. Fl. Cap. 134 (1800); non *Tephrosia humilis* Guill. & Perr. (1832).

Tephrosia pallens sensu *Ecklon & Zeyher*, Enum. Pl. Afr. Austr. 247 (1836); Harvey, Fl. Cap. 2: 205 (1862); Forbes, Bothalia 4: 967 (1948) etc., non *Galega pallens* Ait., Hort. Kew 3: 70 (1789), nec *T. pallens* (Ait.) Pers., Syn. Pl. 2: 329 (1807); DC., Prod. 2: 254 (1825); Bak. f., Leg. Tr. Afr. 191 (1926).

The type of *Galega pallens* Ait. and thus also of *Tephrosia pallens* (Ait.) Pers. is not, as Miss Forbes states, a specimen collected by Thunberg but, as is clearly stated by Aiton, a plant grown at Kew from seeds supplied by Masson from the Cape. Portions of this plant are preserved at the British Museum where they have correctly been identified by Miss Forbes as *T. capensis* (Jacq.) Pers. Thus *Galega pallens* Ait. is a synonym for *G. capensis* Jacq., Ic. Pl. Rar. 3: t. 574 published in 1787 as has been established by B. G. Schubert, Contrib. Gray Herb. 154 pp. 3–23 (1945).

T. angulata seems to be confined to the eastern Cape province and adjacent parts of Natal; a plant from the Katanga identified as *T. pallens* by E. G. Baker is *T. capensis*, while *T. pallens* var. *angolensis* Bak. f., Leg. Tr. Afr. 191 (1926) is *T. coronilloides* Welw. ex Bak.

13. **T. villosa** (*L.*) *Pers.*, Syn. Pl. 2: 329 (no. 23) (1807).

Cracca villosa L., Sp. Pl. 752 (1753). Type: Ceylon, *Hermann* s.n. BM.

Galega villosa L. Syst. Nat. ed. 10, 1172 (1759).

Non *T. villosa* (Michx.) Pers., Syn. 2: 329 (no. 17) (1807) based on *Galega villosa* Michx., Fl. Am. Bor. 2: 67 (1803).

Dr. Cufodontis, Bull. J. Bot. Et. Brux. 25: 280 (1955), argues that *T. villosa* (L.) Pers. was invalidly published because of the simultaneous publication of *T. villosa* (Michx.) Pers., and should be replaced by *T. barba-jovis* (Burm. f.) Cufod., based on *Galega barba-jovis* Burm. f., Fl. Ind. 172 (1768).

This opinion seems to be mistaken. Article 64 of the international rules, 1956 edition, states "when the same new name is simultaneously published for more than one taxon, the first author who adopts it in one sense, rejecting the other, or provides another name for one of these taxa must be followed."

Nuttall, Gen. N. Am. Pl. 2: 120 (1818) published the epithet *T. prostrata* for Michaux's plant because "Michaux's name is necessarily altered in consequence of another species having been before named *villosa*". De Candolle Prod. 2: 250 (1825) used *T. prostrata* Nutt. for the N. American plant and, p. 251, *T. villosa* (L.) Pers. for the Indian plant. Since then no author seems to have used the name *T. villosa* (Michx.) Pers. for the N. American plant, while *T. villosa* (L.) Pers. has frequently been used for the Indian plant, e.g. by Baker, Fl. Tr. Afr. 2; 122 (1871) and Fl. Br. Ind. 2: 120 (1876). It would therefore seem that *T. villosa* (L.) Pers. is not invalidated by the simultaneous publication of *T. villosa* (Michx.) Pers. unless a work published before 1818 can be found which takes the opposite point of view to that adopted by Nuttall.

14. **T. nubica** (*Boiss.*) *Bak.* and related plants (section **Pogonostigma**).

During the last forty years plants have been collected in the drier parts of British East Africa and eastern Ethiopia which, while clearly closely related to *Tephrosia nubica* (Boiss.) Bak., show certain differences from that species. At the same time the degree of variation in true *T. nubica*, the nature of the difference between it and a related taxon from Arabia, and the proper name for the latter have all been matters of doubt. The following is an attempt to clear up these points.

Pod with a stipe c. 2 mm. long; several more or less parallel strongly marked veins (visible by transparency) crossing each valve diagonally, without weakening or breaking up into a diffuse network at its centre; hairs on stems appressed or spreading, very rarely more than 1 mm. long; leaflets often more than 2 cm. long . . . . . 1. *T. nubica*

Leaflet pairs 3–6, usually 4–5; hairs on stems often spreading
α ssp. *nubica*

Leaflet pairs 1–4, usually 2 or 3; hairs on stems usually appressed
β ssp. *arabica*

Pod not, or hardly, stipitate; veins of valve strong at the margin but feeble or breaking up into an obscure network near the middle; hairs on stems usually spreading and often over 1 mm. and up to 2 mm. long; leaflets rarely more than 2 cm. long, in 3–8, usually 5–6, pairs
2. *T. polyphylla*

(1) **T. nubica** (*Boiss.*) *Bak.*, Fl. Tr. Afr. 2: 125 (1871).

α ssp. **nubica**

Pogonostigma nubicum Boiss., Diag. Pl. Or. 2: 40 (1843).

P. abyssinicum Hochst. in Sched. Pl. Schimp. ?1842? (nomen).

P. abyssinicum Jaub. & Spach., Ill. Pl. Or. t. 477–8 (1857).

T. nubica var. *abyssinica* (J. & S.) Schweinfurth, Bull. Herb. Boiss. 4 app. 2: 247 (1896).

Fr. Niger Col.: Baguezane Mts., 8° 30′ E., 17° 45′ N., *Buchanan* s.n. BM.
Sudan Republic: Darfur Prov., *Aglen* 16, *Pfund* 55. Kordofan, *Kotschy* 44 K, BM isotypes, 123, *Pfund* 79. Kassala Prov., *Shabetai* F 1088, *Schweinfurth* 454.
Eritrea: *Pappi* 6870, 6905 BM, 7170, *Schweinfurth & Riva* 600, *Hildebrandt* 578 BM, *Schimper* (1839) 1758 BM isotype of *P. abyssinicum* Hochst. (*Schimper* (1853) s.n. P. type of *P. abyssinicum* J. & S.).
S. Ethiopia: between Sagan and Omo rivers, 36° 5′–50′ E., 4° 45′–55′ N., *Corradi* 3926 FI, 2965 FI, 3977 FI, 4126 FI, 4196 FI, 4197 FI, 4198 FI, 4202 FI.
Fr. Somaliland: Daha bahri, *Popov* 1274 BM.
Kenya: N. Prov., Mt. Kulal, *Bally* 3654; N.E. shore of Lake Rudolph, Elolo, *Corradi* 4325 FI. Turkana, Nataparim, *Champion* T 134; Lokitaung *Padwa* 205.

β ssp. **arabica** (*Boiss.*) *Gillett* stat. nov.

Pogonostigma arabicum Boiss., Diag. Pl. Or. 2: 39 (1843); Jaub. & Spach., Ill. Pl. Or. t 475 (1857).

Catacline sericea Edgeworth, J. As. Soc. Bengal 16: 1214 (1847).

P. boivini Jaub. & Spach., Ill. Pl. Or. t. 476 (1857).

T. pogonostigma Boiss., Fl. Or. 2: 193 (1872).

T. arabica (Boiss.) Martelli, N. G. Bot. It. 20: 360 (1888) non *T. arabica* Steud. ex Vierhapper (1907).

Hejaz: near Jeddah, *Trott* 10, 136, 1235, 1256, 1302; *Kircher* in EA 10946.
Yemen: *Schimper* (1837) 775 K, BM isosyntypes, (*Boivin* s.n. P type of *P. boivini*).
Aden: *Schweinfurth* 39 etc., (*Edgeworth* s.n. type of *C. sericea*). Hadhramaut: *Guichard* HAD 96, 383.
Oman: *Aucher-Eloy* 4496 K, BM isosyntypes, *Jayakar* 18 BM.

The distinction between the two subspecies is slight. The leaflets, besides being fewer, are on the whole somewhat narrower in ssp. *arabica*. Several specimens, for instance *Shabetai* F1088 from Jebel Elba, are intermediate and could well be placed in either subspecies. There is a considerable amount of variation within each subspecies. It does not appear that the differences in the position of the stipe of the pod, to which Jaubert and Spach attached much importance, are correlated with other characters, and it seems that they may well be due to differences in the age of the pod.

(2) **T. polyphylla** (*Chiov.*) *Gillett* stat. nov.

T. nubica (Boiss.) var. *polyphylla* Chiov., Fl. Somala 2: 162 (1932).

T. nubicae affinis: legumine haud, vel vix stipitate, venis leguminis centro tenuioribus, pilis caulium longioribus, foliolis numerosioribus, brevioribus, differt.

Herba sublignescens ad 0·7 vel 1·0 m. alta, caulibus dense albo-tomentosis, pilis et appressis et patentibus ad 2 mm. longis. *Rhachis* folii tomentosa, ad 5 [11] cm. longa, petiolo 2–7 [–17] mm. longo incluso; stipulae tomentosae, lanceolatae-acuminatae, ad 7 mm. longae et 1·5 mm. latae; foliola 7–17, cuneato-oblonga vel cuneato-obovata vel oblanceolata, subtus argenteo-tomentosa, superne tomentosa, nervis lateralibus primariis utrinque c. 7, ad 2 [–3] cm. longa et 7 [11] mm. lata, apice rotundata, truncata vel retusa. *Racemi* terminales, multiflori, ad 15 [–30] cm. longi, floribus paucis in axillis foliorum superiorum etiam saepe dispositis; bracteae tomentosae, lanceolatae, caducae; pedicelli c. 4 [–6] mm. longi. *Calyx* fulvo-tomentosus, tubo 2 mm. longo, lobis triangulariis longe acuminatis, superioribus, basin 0·5 mm. coalitis, in toto 5 [–9] mm. longis, lobis lateralibus et inferiore c. 6 [–9] mm. longis. *Vexillum* externe fulvo-sericeo-tomentosum, unguiculo 1·5 [–2] mm. longo, lamina suborbiculare 8 [·11] mm. diametro. *Alae* glabrae, unguiculo 2 mm., lamina 8 [–10] mm. longo. *Carina* glabra, 2 mm. unguiculata, lamina sensim rotundata, 7 [–10] mm. longa. *Filamentum* vexillare versus basin ad alia paulo adhaerens, 1 mm. supra basin paulo dilatatum; filamentorum aliorum pars connata c. 6 [–8] mm. longa, pars libera 2–3 [–5] mm. longa; antherae 0·5 [1] mm. longae. *Ovarium* tomentosum 1-ovulatum, c. 4 mm. longum, haud, vel vix, stipitatum; stylus glaber, sensim curvatus, apice penicillatus, in toto 5–6 [9–10] mm. longus. *Legumen* inaequaliter ovatum, 1-spermum, c. 11 mm. longum, 6 mm. latum, 2 mm. crassum, forsan indehiscens?, dense albo- (ad suturas stramineo-) tomentosum, pilis 2 mm. longis, basin haud vel vix (ad 0·5 mm.) stipitatum, dorso fere rectum, subtus rotundatum, apice rostratum; nervi valvarum prope suturas validi crassique, ad mediam tenues, vel in rete incertum divisi. *Semen* brunneum, corrugatum, suboblongum, c. 4 mm. longum, 2 mm. latum, 1·5 mm. crassum, hilo medio in latere longiori, minute carunculato.]

Ethiopia: Ogaden: 45° 28′ E., 7° 18′ N., Bulleh Sirauw, c. 600 m., at high water level, 35 cm. tall, corolla blue, 27.11.1944, *Glover & Gilliland* 416 K, EA, BM; South of Bohotleh, c. 300 m., thin bush up to 1 m. tall, grazed by all stock, GED HADJIN (Somali), 19.8.1941, *Peck* 63. Galla Sidamo: Uacille, 39° 4′ E., 4° 32′ N., c. 1200 m., 25.9.1939, *Corradi* 3980 FI (in fruit).

Somalia. Plains of Gobuin (Gobuen) and dunes of Chisimaio, 1926, *Gorini* 376 FI syntype, 393 FI syntype, 394 FI lectotype.

Kenya: N. Prov.: 40° 20′ E., 3° 56′ N., Banessa Pan, 1020 m., shallow grassy soil over limestone by pan, in *Acacia-Commiphora* open scrub, 60 cm. tall, corolla purple, 22.5.1952, *Gillett* 13260 K, EA. 64 km. N. of Archer's post, 900 m., shrub 1 m. tall, corolla magenta or mauve, Feb. 1950, *Dale* K 761. Barsaloi, 36° 52′ E., 1° 20′ N., c. 1000 m., 1936, *Lady Jex Blake* in EA 9194. Without precise locality, June 1948, *Mrs. Merryll Dalton* in Bally 6302. Guaso Nyiro, 900 m., common near river after rain, low growing herb with pink flowers, 18.8.1951, *Mrs. Merryll Dalton* 22. 32 km. N. of Wajir, plains, red sandy soil, erect herb to 0·5 m. tall, common locally, 1.9.1953, *Bally* 9090. Wajir, 240 m., rainfall 200 mm., red sandy soil in *Acacia-Commiphora* scrub, 0·5 m. tall, pale purple flowers, DARGA AD (Somali), Jan. 1955, *Hemming* 440, 472. Central Prov.: Nziu, c. 65 km. N.E. of Kitui, semi-arid areas, often dominant on abandoned cultivation and over-grazed lands, woody herb to 0·7 m. tall, 15.11.1946, *Edwards* 69 EA. Nguni, c. 38° 20′ E., 0° 48′ S., 780 m., on sandy soil, mixed with *T. villosa* var. *incana*, 24.1.1954, *Bally* 9475/A.

Tanganyika: Pare district, Buiko-Hedaru, 600 m., 13.6.1915, *Peter* K177.

The differences in the fruit between *T. nubica* and *T. polyphylla* are precise, though readily overlooked unless the calyx is removed to show the stipe or absence thereof, and a valve held against the light to show the venation: they appear to be consistently associated with the vaguer but more readily observed differences in leaflets and indumentum. The areas of the two species, so far as is known, do not overlap.

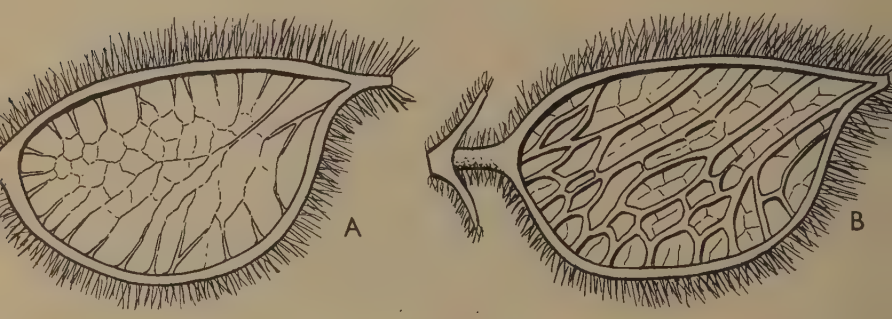


Fig. 3. Fruits of A. *Tephrosia polyphylla* and B. *T. nubica* ssp. *nubica*. A. from *Gillett* 13260, B. from *Bally* 5654. × approx. 5.

In each case one valve is shown as seen when examined from inside by transparency against the light.

The larger dimensions, given in square brackets in the description of *T. polyphylla*, are taken from *Dale* K761 which is a stout plant, larger in all its parts than the other specimens, but otherwise similar to them. As the type does not show mature fruit, this and the seed are described from *Gillett* 13260.

T. polyphylla, apart from its 1-seeded pod, is very similar to *T. villosa* (L.) Pers. var. *incana* (Roxb.) Bak. (*T. ehrenbergiana* Schweinf.); so much so that, in the absence of fruit, the two species can only be distinguished with certainty, by dissecting the ovary. *T. villosa* var. *incana* occurs commonly in the area of *T. polyphylla*, the two species sometimes being found growing together and flowering simultaneously (for instance *Gillett* 13259 and 13260 at Banessa pan). Furthermore all the characters which separate *T. polyphylla* from *T. nubica* are also characters of *T. villosa* var. *incana*. These facts suggest that *T. polyphylla* may have arisen through some process of hybridisation

between *T. nubica* and *T. villosa* var. *incana*, though, in view of the present absence of *T. nubica* from the area of *T. polyphylla*, any such hybridisation must have taken place long ago.

B Species with the style pubescent, at least along the inner (adaxial) surface (15–20).

15. **T. longipes** *Meissn.* in Hook., Lond. J. Bot. 2: 87 (1843); Young, Ann. Transvaal Mus. 14: 398, t. 11 (1932); Forbes, Bothalia 4: 980 (1948). Non sensu Bak., Fl. Tr. Afr. 2: 120 (1871).

α var. **longipes**

T. secunda Welw. ex Bak., Fl. Tr. Afr. 2: 115 (1871).

T. stormsii De Wild., Ann. Mus. Cong. Belg. ser. IV: I: 189 (1903); Cronquist, Fl. Congo Belge 5: 106 (1954) mostly.

T. pseudolongipes Bak. f., Leg. Tr. Afr. 199 (1926).

T. eylesii Bak. f., Leg. Tr. Afr. 200 (1926).

Belgian Congo: Katanga: *Hirschberg* 77; *Hoffman* 883; *Robyns* 1814. Sudan republic: Dar Fertit, Deim Bekir, c. 26° 25′ E., 6° 55′ N., 30.1.1871, *Schweinfurth* 68. Kenya: Coast. Tanganyika: Bukoba district: Shinyanga district: Tabora district: Mpanda District, Karema (*Storms* s.n. BR type of *T. stormsii*): Morogoro district: Mbeya district: Iringa district: Rungwe district: Songea district. Port. E. Africa. Nyasaland. S. Rhodesia: *Eyles* 265 BM holotype of *T. eylesii*, *Walters* 2207 holotype of *T. pseudolongipes*, etc. N. Rhodesia. Angola: Pungo Andongo *Welwitsch* 2107 isotype of *T. secunda*. Transvaal. Natal: *Krauss* 20 holotype, etc.

β var. **lurida** (*Sond.*) *Gillett* stat. nov.

T. lurida Sond., Linnaea 23: 30 (1850); Young, Ann. Transvaal Mus. 14: 402 t. 12 (1932); Forbes, Bothalia 4: 979 (1948).

T. laxiflora Fries, Wiss. Ergeb. Schwed. Rhod. Kongo Exp. 1: 83 t. 8, fig. 6 (1914).

T. dowsonii Bak. f., Leg. Tr. Afr. 190 (1926).

[*T. paucijuga* sensu Cronquist, Fl. Cong. Belg. 5: 106 (1954), non Harms.]

Belgian Congo: Katanga, *Quarré* 4262; Ruanda-Urundi, *Lebrun* 9721. Kenya: Nairobi, *Dowson* 519 holotype of *T. downsonii*, etc. Tanganyika. S. Rhodesia. N. Rhodesia: (*Fries* 1115 UPS holotype of *T. laxiflora*). Transvaal: Magalisberg *Zeyher* 456 type. Orange Free State. Bechuanaland.

Differs from var. *longipes* in having a perennial woody rootstock, shorter stems, often prostrate, fewer leaflets (3–11 most often 5, instead of 9–17) which are often less acute at the apex. Dr. Cronquist confused this plant with *T. paucijuga* Harms which is very similar in all respects except the fruit which is 2–4-seeded and c. 8 mm. wide instead of 9–14 seeded and 3–5 mm. wide as in *T. longipes*.

γ var. **ringoetii** (*Bak. f.*) *Gillett* stat. nov.

T. ringoetii Bak. f. in De Wild., Bull. Soc. Roy. Bot. Belg. 57: 126 (1925).

T. jelfiae Bak. f., Leg. Tr. Afr. 202 (1926).

T. stormsii sensu Cronquist, Fl. Cong. Belg. 5: 106 (1954), partly, non De Wild.

Belgian Congo: Katanga, Shinsenda, (*Ringoet* 5 BR holotype). N. Rhodesia: Copper belt, Mufalira, *Eyles* 8254 and *A. W. Cruse* 324 and 510; Kitwe, *Fanshawe* 991 and 2151; Ndola, *Fanshawe* 1072. Northern Province: Luwingu *Mrs. Jelf* 23 BM (type of *T. jelfiae*).

This variety differs from var. *longipes* in the short long-pedunculate racemes consisting of 1–3 nodes only and the long spreading white hairs on calyx, pedicel, stem and leaf rhachis.

In general both var. *longipes* and var. *lurida* show a bewildering amount of variation in flower size, length of calyx lobes, width of fruits and especially in the number, width and length of the leaflets. So many intermediates exist between the numerous forms that it seems inevitable that a very broad view of the species should be taken, as has been done here.

16. **T. punctata** *Gillett* sp. nov.

T. kasikiensi Bak. f. affinis: ab ea foliolis punctatis, racemis laxioribus indumento appresso sparsiore, carina glanduloso-punctata, leguminibusque ascendentibus pilis albidis subsparsis appressis indutis, differt.

Herba erecta annua, vel forsan breviter perennans, 50–140 cm. alta; caules subcylindrici virides, pilis albis appressis, 0·2–0·5 mm. longis ± sparse vestiti. *Rachis foliorum* ad 6 [10] cm. longa, petiolo 5–13 mm. longo incluso, ultra foliola lateralia haud prolongata; petioluli dense appresse fulvo-pilosi, terminale ad 2·5 mm. longo, aliis paulo longiore; stipulae subulatae, virides, ad 7 mm. longae; foliola [5]–7–11[–17], elliptico-oblonga vel oblanceolata, perlucide punctata, apice emarginata et apiculata, ad 35 [60] mm. longa et 12 [14] mm. lata, supra glabra, infra subsparse appresse albo-pilosa, costa mediana infra prominente, lutea, nervis primariis utrinque c. 11, nervulis ultimis transversalibus obscurissimis, haud rubris. *Racemi* terminales et axillares, longi, laxi, pedunculati, [interdum ramosi], appresse pilosi; interdum flores pauci etiam in axillis supremis positi, bracteae subulatae, persistentes, 2–4 mm. longae; pedicelli appresse aureo-vel brunneo-pilosi, ad 4 mm. longi. *Calyx* glandulosus, aureo-brunneus, appresse breviter pilosus, tubo c. 2 mm. longo, dentibus superioribus fere ad apicem connatis, dentibus lateralibus triangularis, 1·3 mm. longis, dente inferiore triangulario subulato 2 mm. longo. *Vexillum* extus appresse aureo-pilosum, intus purpureum vel album, reniforme, 8–9 mm. longum, c. 11 mm. latum, glandulosum; alae purpureae vel albae, glabrae, glandulosae; carina alba, glabra, glandulosa, unguiculo 2·5 mm. longo, lamina 5 × 7 × 7 mm. longa, apice incurvata. Filamentum vexillare alios leviter adhaerens, c. 1 mm. supra basin incrassatum; filamentorum aliorum pars connata 5–7 mm., partes liberae 2–4 mm. longae; antherae c. 0·5 mm. longae. *Ovarium* dense albo-strigosum, c. 5 mm. longum, 8–10-ovulatum; stylus linearis, utrinque pubescens, prope basin per 90° curvatus, c. 5 mm. longus, 0·3–0·4 mm. latus. *Legumen* (paulo immaturum) ascendens, paulo sursum curvatum, subviride, pilis appressis albidis 0·5 mm. longis haud dense obsitum, c. 5 cm. longum et 3·5 mm. latum, rostro subrecto. *Semina* (immatura) 8 9, ut videtur longitudinalia.

Belgian Congo: Katanga: Musonoie, 25° 25′ E., 10° 42′ S., 6.3.1931. *Ritschard* 1784 BR.
Tanganyika: Ufipa district: Sumbawanga area, Chapota, 1650 m., among tall coarse grass, corolla lilac, back of standard greyish brown, 9.3.1957, *Mrs. Richards* 8606. Iringa district: Iringa west ridge survey beacon, c. 1650 m. in crevices on a large flat-topped granite boulder, 15.3.1932, *Lynes* I.h. 215.b.
N. Rhodesia: Abercorn district: Chiwale farm, 1650 m., old cultivation on reddish dolerite soils in *Brachystegia-Uapaca* woodland, flowers yellow veined with purplish brown, 2.4.1932, *St. Clair-Thompson* 1125. Abercorn, 1650 m., secondary *Brachystegia* woodland, flowers white, the standard with blackish indumentum outside, 26.3.1951, *Bullock* 3792 holotype. Ndundu, below house by drive, 1500 m., in thick long grass on peaty soil, standard and wings blue, keel white, 23.2.1952, *Mrs. Richards* 799. Abercorn, Simanwe Farm, 1500 m.,

damp ground by furrow in thick grass, corolla pale mauve, 21.2.1955, *Mrs. Richards* 4600. Old road to Pans near Abercorn, 1500 m., grass at roadside, standard mauve inside brown outside, wings mauve, keel white, 1.3.1955, *Mrs. Richards* 4731. Old Kambola Road, 1470 m., 14.3.1955, *Mrs. Richards* 4932. Lake Chila, 1500 m., 14.3.1955, *Mrs. Richards* 4932. Ibid., 15.3.1955, *Mrs. Richards* 4964. Kambola, 1500 m., 5.6.1957, *Mrs. Richards* 10028. Mwinilunga district: just S. of Matonchi farm, 1350 m., *Brachystegia* woodland, standard brown outside, rest of flower white, 19.2.1938, *Milne-Redhead* 4636.

This species has been confused with *T. kasikiensis* Bak. f., which occurs in the mountains west of Lakes Tanganyika and Kivu at an altitude of c. 2000 m. *T. kasikiensis* has leaflets which are hardly punctate, with a scarious margin and a red network of transverse ultimate veins, more spreading indumentum on the calyces and racemes (which are more congested), and less erect, 7—8-seeded pods covered with spreading dark-brown hairs. The following specimens of *T. kasikiensis* have been seen: *De Witte* 381 BM, BR, 382 BM, BR, 450 BM, BR (isotypes). *Humbert* 7801 BR, *Jurion* 319 BR. Although each difference is small in itself the sum total, when the whole body of material is compared, makes it clear that two distinct species are represented. The pellucid dots in the leaflets, on which the epithet *punctata* is based, are found to a less marked extent in several other species of *Tephrosia* although they seem to have escaped attention in published accounts of the genus.

T. interrupta *Hochst. & Steud. ex Engl.*, Hochgebirgsflora Trop. Afr. 260 (1892); Chiov. in Pirotta, Fl. Eritrea, Ann. Ist. Bot. Rom. 8: 419 (1908).

α ssp. **interrupta.**

T. dichroocarpa Steud. ex A. Rich., Tent. Fl. Ab. 1: 185 (1847) pro min. parte, non quoad typum, sensu Bak., Fl. Tr. Afr. 2: 110 (1871) pro maj. parte, non ut emend. Engler l.c. et Chiov. l.c.

?*T. ustulata* Taub. ex Harms, Ann. Ist. Bot. Rom. 7: 93 (1897)?

Hochstetter and Steudel named *T. interrupta* and *T. dichroocarpa* without describing them. Richard described *T. dichroocarpa* and, misled by superficial similarities, sank in it *T. interrupta*. Baker accepting the name *dichroocarpa*, with *interrupta* as a synonym, described the species over again wholly, or at least mainly, from specimens of *interrupta*. Having thus misinterpreted *T. dichroocarpa*, when faced with an unnamed Schimper specimen of the true *dichroocarpa*, Baker described it again as *T. brunnea*, whose type specimen at Kew bears a printed label reading "Plantae Abyssinicae ex Tigre v. Begemder collegit Schimper a. 1863–8" and the number 292. This is almost certainly part of the same gathering as the Berlin sheet "Amba Harres um 2400 m. (Schi. 1862 n. 292)" identified by Engler l.c. as *T. dichroocarpa*. It seems probable that Kew in 1869 received from Paris a bundle of Schimper duplicates without detailed data and that a mistake was made in putting 1863–8 instead of 1862–8 on the printed labels.

Engler (1892) seems to have been the first to realise Richard's and Baker's mistake: in separating *T. interrupta* from *T. dichroocarpa* he mentioned one character only, the broader calyx lobes. Chiovenda (1908) mentioned several further characters, several of which however break down when the full variability of *T. interrupta* is studied. The most fundamental character seems to be the style, which neither Chiovenda nor E. G. Baker mentions. That of *T. dichroocarpa* is gently curved throughout its length, c. 3 mm. long, terete, tapering, c. 0·15 mm. wide towards the apex, pubescent

near the base, glabrous above, subcapitate and penicillate at the tip. That of *T. interrupta* is bent sharply at the base, then straight, c. 7 mm. long, flattened, linear, grooved and pubescent on its adaxial surface, c. 0·7 mm. wide, rounded and neither subcapitate nor penicillate at the tip. *T. dichroocarpa*, which seems most nearly related to *T. athiensis* Bak. f., is a local species still known only from 3 gatherings by Schimper in the N. Ethiopian highlands. *T. interrupta* in one form or other ranges from Eritrea to Nyasaland and is often abundant. It has not been possible to trace Baker's reason for stating that this species occurs in Madagascar.

It has not been possible to see the type of *T. ustulata* Taub. ex Harms, *Riva* 556 from "inter Tumpe et Ciaffa", in S. Ethiopia (within 60 km. of Arero, 38° 40′ E., 4° 45′ N.). The authorities at Florence could not find it when kindly loaning other *Tephrosia* types for examination at Kew. *T. ustulata* is said to differ from *T. interrupta* in its subulate bracts but may be a form of this species, whose bracts are sometimes much narrower than in the type.

I am happy to have the support of my colleague Mr. A. A. Bullock, whose mastery of the intricacies of nomenclature is well known, for the view that Engler's differentiation between *T. dichroocarpa* and *T. interrupta* constitutes valid publication of the latter species. So long as this view is acceptable the possibility that the type of *T. ustulata* may be found and turn out to be conspecific with *T. interrupta* will not upset the name of this common and ecologically important species.

β ssp. **mildbraedii** (*Harms*) *Gillett* stat. nov.

T. nyikensis Bak., Kew Bull. 1892: 25 partly, not as emend. Cronquist, Fl. Cong. Belg. 5: 115 (1954).

T. mildbraedii Harms in Mildbraed, Deutsch Zentr. Afr. Exped. 2: 255 t. 28 (1911). Fl. Cong. Belg. 5: 114 (1954).

T. atroviolacea Bak. f. in De Wild., Bull. Soc. Bot. Belg. 57: 115 (1925).

T. doggettii Bak. f., Leg. Trop. Afr. 213 (1926).

This differs from ssp. *interrupta*, which is itself very variable, in the inflorescence reduced to one or a few nodes, the absence of the bracteoles on the upper part of the pedicel, flowers often rather larger, the style always pubescent on both surfaces and a larger caruncle. The types of the taxa represent extreme forms and look very distinct but in Western Kenya and Uganda so many intermediates occur, exhibiting some characters of each taxon, that it is more satisfactory to treat the difference as subspecific rather than specific.

γ ssp. **elongatiflora** *Harms ex Gillett* ssp. nov.

Herba vel suffrutex sublignosus saepius 2 m. sed interdum ad 6 m. altus. Flores ut in ssp. *interrupta* in racemis longis laxis interruptis (internodis saepe ultra 2 cm. longis) dispositi, magni. Vexillum ad 21 mm. longum, 19 mm. latum. Filamentorum pars connata 17–19 mm. longa. Bracteoli ad partem superiorem pedicelli vel ad basin calycis desunt. Stylus utrinque pubescens. Legumen ad 9 cm. longum, c. 5 mm. latum. Semina 10–13, carunculo c. 1 mm. longo.

Tanganyika: Mbeya district: 1500–1800 m., riversides, common, flowers purple, 1.5.1935, *Emson* 403, K, EA; Mbosi, 1500 m., July 1935, *Miss Horsbrugh-Porter* s.n. BM. Rungwe district: Kyimbila, 1350 m., montane grassland, flowers lilac, 8.9.1910 *Stolz* 240 K, holotype;

Kiwara river basin, in secondary bush with *Dodonaea*, *Smithia*, *Rumex* and *Artemisia* on yellow-brown volcanic soil, 11.8.1949, *Greenway* 8413 K, EA. Iringa district: Sao 1950 m. black soil by stream with *Aeschynomene* and giant *Lobelia*, up to 6 m. tall, 30.7.1933, *Greenway* 3426 K, EA; Iheme, 1800 m., Aug. 1934, *Mrs. Ward* 19 EA; Kisitu ridge 1650 m., 7.10.1936, *McGregor* 36 K, EA; Songea district; Liwiri Kileza Forest reserve, 30.10.56, *Mgaza* 129.

PORT. E. AFRICA: Vila Cabral district: near source of M'Singe river 35° 08′ E., 13° 18′ S., 1300 m., edge of gallery forest, Aug. 1931, *Gomes e Sousa* 873. Massangulo, Chilope River, *Gomes e Sousa* 1456 BM.

NYASALAND: Masuku plateau, c. 2000 m. July 1896, *A. Whyte* s.n.; Koto-Kota district, Nchisi Mt., 1400 m., sporadic in *Brachystegia* woodland 24.7.1946, *Brass* 16899; ibid., 1350 m., 1.8.1946, *Brass* 17078.

This subspecies resembles ssp. *interrupta* in its elongated racemes but ssp. *mildbraedii* in the absence of bracteoles at the base of the calyx, the style pubescent on both side and the larger caruncle. It differs from both in its longer flowers and fruit. The type is labelled in a German hand "*Tephrosia confir. elongatiflora Harms*" but this epithet seems never to have been published.

18. **T. platycarpa** *Guill. & Perr.* and its allies.

These are annuals with pubescent styles, transverse seeds, and a marked tendency for the distal part of the pod to be curved downwards instead of upwards as is more usually the case in *Tephrosia*. In more arid areas stunted dwarf forms occur which have received the names *T. platycarpa*, *T. humilis* and *T. nana*. In more humid regions luxuriant forms occur which have been called *T. flexuosa*, *T. ansellii*, *T. barbigera* and *T. polysperma*. Hitherto, whatever reductions may have been made within each class, authors, on account of the marked difference in aspect between the type specimens, have persisted in treating the dwarf plants as distinct species from the luxuriant plants. However, when due allowance is made for the stunting effect of aridity, especially on annual plants, and when the whole series of intermediate forms now available is studied, this distinction is impossible to maintain and, in the following treatment, the dwarf plants are united with those luxuriant plants which seem to differ from them in this respect alone. Unfortunately, as the more arid northern fringes of tropical Africa were visited by botanists on the whole rather earlier than the more extensive humid regions, this means replacing well known by little known names.

(a.) **T. platycarpa** *Guill. & Perr.*, Tent. Fl. Sen. 1: 195 (Jan. 1832); Bak. Fl. Tr. Afr. 2: 109 (1871); Bak. f., Leg. Tr. Afr. 187 (1925); Hutch. & Dalz., Fl. W. Tr. Afr. 1st ed. 1: 335 (1928) 2nd Ed. 1: 529 (1958) mostly, excl. syn.; non sensu Andrews, Fl. Sudan 2: 238 (1952).

T. flexuosa G. Don, Gen. Syst. 2: 232 (Nov. 1832); Bak., Fl. Tr. Afr. 2: 111 (1871); Bak. f., Leg. Tr. Afr. 203 (1925); Hepper in Hutch. & Dalz. Fl. W. Tr. Afr. 2nd Ed. 1: 530 (1958).

T. ansellii Hook. f., Niger Fl. 297 (1849); Bak., Fl. Tr. Afr. 2: 115 (1871); Bak. f., Leg. Tr. Afr. 201 (1925); Hutch. & Dalz., Fl. W. Tr. Afr. 1: 385 (1928).

SENEGAL: *Leprieur* BM isotype.

GAMBIA; PORT GUINEA; FR. GUINEA; FR. SUDAN; IVORY COAST; GHANA; TOGOLAND; NIGERIA, *Ansell* s.n., *Vogel* 110 syntypes of *T. ansellii*, ST. THOMÉ, *Don* s.n. BM holotype of *T. flexuosa*; OUBANGUI-CHARI, *Chevalier* 9742 (doubtful in the absence of fruit).

(b.) **T. humilis** *Guill. & Perr.*, Tent. Fl. Sen. 1: 196 (Jan. 1832); Bak., Fl. Tr. Afr. 1: 109 (1871); Bak. f., Leg. Tr. Afr. 187 (1926).

T. platycarpa sensu Hutch. & Dalz., Fl. W. Tr. Afr. 1st ed. 1: 238 (1928); 2nd Ed. 1: 529 (1958) partly non Guill. & Perr.

SENEGAL: *Perrottet* BM isotype; GAMBIA *Hayes* 565; N. NIGERIA *Batten Poole* 152, *Lely* 584, *Olorunfemi* in FHI 24362; SUDAN REPUBLIC Seriba Ghattas, 1869, *Schweinfurth* 8289.

(c.) **T. nana** *Kotschy ex Schweinf.*, Reliq. Kotsch. 20 t. 16 (1868); Bak., Fl. Tr. Afr. 2: 109 (1871); Bak. f., Leg. Tr. Afr. 188 (1926); Andrews, Fl. Sudan 2: 238 (1952).

T. barbigera Welw. ex Bak., Fl. Tr. Afr. 2: 113 (1871); Bak. f., Leg. Tr. Afr. 196 (1926); Hutch. & Dalz., Fl. W. Tr. Afr. 1: 385 (1928); Andrews, Fl. Sudan 2: 240 (1952); Cronquist, Fl. Congo Belge 5: 111 (1954); Hepper in Hutch. & Dalz., Fl. Trop. Afr. 2nd Ed. 1: 530 (1958).

T. polysperma Bak., Fl. Tr. Afr. 2: 113 (1871); Tr. L. Soc. 29: 55, t. 30 (1872).

T. nana var. *angolensis* Bak., Fl. Tr. Afr. 2: 113 (1871).

T. barbigera var. *subglabra* Bak. f. in De Wild., Bull. Soc. Bot. Belg. 57: 116 (1925); Leg. Tr. Afr. 196 (1926).

T. humilis var. *major* Bak. f. in De Wild. ibid. 119 (1925).

T. barbigera var. *bakeriana* (Hiern) Bak. f., Leg. Tr. Afr. 197 (1926).

WEST AFRICA FROM SENEGAL EASTWARDS; FR. CONGO; B. CONGO (*Claessens* 232 BR, *Luja* 162 BR, *Goossens* 2525 BR, *Bequaert* 7141 BR syntypes of *T. barbigera* var. *subglabra*); SUDAN REPUBLIC (*Boriani* 109W) and Matamma near Gallabat *Schweinfurth* 1871 K, BM isosyntypes of *T. nana* (*Mearns* 3006 BR holotype of *T. humilis* var. major); UGANDA, *Grant* s.n. holotype of *T. polysperma*; KENYA, Lake Prov.; TANGANYIKA; N. RHODESIA; ANGOLA, *Welwitsch* 2096, 2097 isosyntypes of *T. barbigera*; *Welwitsch* 2100 BM isotype of *T. nana* var. *angolensis* and *T. barbigera* var. *bakeriana*.

The differences between these 3 species may be summed up as follows:

A. *T. platycarpa*	B. *T. humilis*	C. *T. nana*
Pods 7–8 mm. wide.	4–5 mm. wide.	5–6 mm. wide.
Seeds 5–8.	8–12	9–18
Raceme usually much longer than peduncle.	As in A.	Raceme usually shorter than peduncle.
Flowers usually present in axils of upper leaves.	As in A.	Flowers rarely present in leaf axils.
Hairs white or pale yellow.	As in A.	Hairs commonly fulvous.
Filament sheath 8–10 mm. long.	c. 8 mm.	10–12 mm.
Upper surface of leaflets pubescent.	glabrous	Glabrous in W. Africa, pubescent in E. Africa.

T. nana and *T. platycarpa* are closely related and are difficult to distinguish in the absence of fruit. *T. humilis* may well be of hybrid origin. It is strange that while *T. nana* may usually be distinguished from *T. platycarpa* in West Africa by its leaflets being glabrous above, east of the Cameroons it seems always to have leaflets pubescent above. The statement in Fl. W. Trop. Afr. 2nd Edn. that *T. flexuosa* occurs in the Congo seems to be due to a misinterpretation of non-fruiting specimens of this eastern form of *T. nana*.

19. **T. cordatistipula** *Gillett* n. sp.

Species a congeneribus omnibus Africae tropicalis stipulis cordatis distincta. A *T. diffusa* (E. Mey.) Harv., specie natalense, leguminibus, foliis, foliolisque longioribus et dentibus calycis brevioribus differt.

Herba procumbens, caulibus rubescentibus sparse appresseque pilosis. *Rhachis folii* ad 10 cm. longa, petiolo ad 4 cm. longo incluso, ultra foliola lateralia haud, vel 1 mm. tantum, prolongata; stipulae membranaceae, striatae, sparse pilosae, late ovatae, basin inaequaliter cordatae, ad 8 mm. longae et 5 mm. latae; foliola 7–15, petiolulis pilosis 2 mm. longis, anguste oblonga basin attenuata, apice rotundata, superne glabra, infra pilosa, ad 3·5 cm. longa et 5 mm. lata. *Racemi* 5–10-flori, ad 5 cm. pedunculati, floribus paucis interdum etiam in axillis foliorum superiorum; bracteae late ovatae, caducae, sparse pilosae; pedicelli ad 5 mm. longi, dense appresseque pilosi. *Calyx* rubescens, sparse appresseque pilosus, tubo 2–3 mm. longo, dentibus superioribus minutis (c. 0·2 mm. longis) conniventibus, dentibus lateralibus ovatis, minute acuminatis, 1·5 mm. latis, 1 mm. longis, dente inferiore ovato-acuminato 2 mm. lato, 2·5 mm. longo. *Vexillum* obovatum extus aureo et argenteo sericeum, obovatum, basin in unguiculum c. 1 mm. longum attenuatum, ad apicem emarginatum, c. 15 mm. longum, c. 16 m. latum. *Alae* glabrae, unguiculo 2 mm. longo, lamina 1 mm. longa, basin 2 mm., apicem versus 5 mm. lata, apice rotundata. *Carina* glabra, unguiculo 2 mm. longo, lamina triangularia, lateribus 11, 7 et 12 mm. longis, angulo inferiore rectangulare curvato, angulo superiore paulo rostrato. *Filamentum* vexillare ad alia paulo adhaerens, 1 mm. supra basin abrupte calloso incrassatum et dilatatum; filamentorum aliiorum pars conjuncta c. 12 mm., pars libera 3–4 mm. longa, anthera 0·7 mm. longa. *Ovarium* pubescens 12 mm. longum; stylus utrinque pubescens, 6 mm. longus, fere ad basin abrupte per 80° curvatus, apice haud penicillato. *Legumen* planum, fere rectum, 10–13-spermum, sparse appresse pilosum, stramineum, suturis incrassatis viridibus, ad 5 cm. longum et 5 mm. latum, c. 1·5 mm. crassum. *Semina* levia, atro-viridia haud carunculata, fere transversa, c. 3 mm. longa et 1·8 mm. lata, hilo laterale prope basin seminis.

Uganda: Teso district, Amuria, 1100 m., rainfall 1180 mm., on granite outcrops, flowers pinkish white, 13.9.1946, *Thomas* 4531 K holo, EA isotype.

The geographical isolation of *T. cordatistipula* from its nearest allies, which lie among a group of S. African species (Section 4 in Miss Forbes's revision of the S. African species of *Tephrosia*, Bothalia 4, 951 (1948)) is very remarkable.

20. **T. rupicola** *Gillett* sp. nov.

T. huillensi Welw. ex Bak. affinis: ab ea petiolis multo brevioribus; foliolis brevioribus, superne pubescentibus; pedunculis brevioribus; leguminibus brevioribus, c. 8-spermis, ad lateres glabris, differt.

Suffrutex sublignosus ad 1 m. altus, caulibus dense fulvo-tomentosis, pilis ad 2 mm. longis. *Rhachis foliorum* fulvo-tomentosa, ad 9 cm. longa, petiolo 2–5 mm. longo incluso, ultra foliola lateralia 1–2 mm. prolongata; stipulae ovato-acuminatae, externe hirsutae, intus brunneae et glabrae, c. 3 mm. latae, ad 7 mm. longae; foliola 11–17, oblanceolata, ad 3 cm. longa et 11 mm. lata, apice emarginata et recurvato-apiculata, subtus dense appresse pilosa et ad costam fulva, superne appresse pubescentia, nervis primariis utrinque

c. 8. *Flores* rosei in racemis terminalibus fulvo-tomentosis 1–4 cm. pedunculatis et in axillis foliorum superiorum dispositi; bracteae caducae, late lanceolatae, ad 10 mm. longae et 4 mm. latae, externe tomentosae, intus brunneae et glabrae; pedicelli fulvo-tomentosi, ad 8 mm. longi. *Calyx* fulvo-tomentosus, tubo 3–4 mm. longo, lobis longe triangulario-acuminatis, c. 8 mm. longis, duo superioribus c. 3 mm. connatis. *Vexillum* externe fulvo-tomentosum, apice emarginatum, in toto 19 mm. longum, 16 mm. latum, basin in unguiculum 3 mm. longum attenuatum. *Alae* glabrae, dolabriformes, unguiculo 2 mm. longo, lamina 16 mm. longa, 7 mm. lata. *Carina* glabra, unguiculo 3–4 mm. longo, lamina rectangulare triangularia c. 10 × 12 × 14 mm. *Filamentum* vexillare aliis leviter connatum, 1 mm. supra basin valide calloso incrassatum; filamentorum aliorum pars connata c. 14 mm., pars libera 5–6 mm. longa; antherae 1·3 mm. longae. *Ovarium* c. 10 mm. longum, c. 8-ovulatum, ad lateres glabrum, ad suturas dense pilosum, stylo pubescente, lineare, in toto 11 mm. longo, c. 2 mm. supra basin per 100° curvato, versus apicem attenuato, apice incurvato. *Legumen* c. 3 cm. longum et 8 mm. latum, ad lateres glabrum, ad suturas dense fulvo-hispidum, pilis c. 1 mm. longis, rostro terminale fere centrale, recto. *Semina* 7–8, transversa, ellipsoideo-oblonga, 3–4 mm. longa, c. 1·5 mm. lata, vix carunculata, funiculo 2–2·5 mm. longo, hilo prope centrum lateris longioris.

Southern Rhodesia: Marendellas district: Dombi-dombi granite outcrop, c. 1590 m., shrub with pink flowers, 13.3.1949, *H. D. L. Corby* 410 (SRGH 22852) K, holo SRGH iso. ibid. on granite rocks, bush 1 m. tall, flowers purple, 3.4.1950, *H. Wild* 3249 (SRGH 27350); locality not specified but probably Makoni district: near Rusapi, on rocks, c. 1921, *A. Hislop* 333.

Popular Encyclopedia of Flowering Plants.*—In this encyclopedia the author describes over 700 greenhouse and garden plants in alphabetical order under their popular names with their botanical names added.

The introduction deals briefly with the general principles of cultivation, such as the preparation of the soil, manures, fertilisers, planting, sowing seed, potting, cuttings and other gardening operations. Notes on cultivation and propagation are provided for each of the plants described. There are more than 450 line drawings and photographs to add to the interest of this useful book. The encyclopedia ends with an index to the subjects discussed in the introduction (pp. 9–16). This book contains a good measure of valuable advice for all gardening enthusiasts.

H. S. Marshall.

*Amateur Gardening Popular Encyclopedia of Flowering Plants. By A. G. L. Hellyer. Pp. 104. Illus. London: W. H. & L. Collingridge Ltd. New York: Transatlantic Arts Inc. 1957. Price 15/-.

Tropical African Primulaceae

P. Taylor

1. New species and additional records in the genus Anagallis.*

Since the publication of my previous paper a considerable amount of African material of the genus has been received by the Kew and British Museum Herbaria. Amongst this material are specimens representing new species, hitherto imperfectly known species and additional geographical records. The purpose of the present paper is to bring our knowledge of the genus up to date in the light of this additional material.

At the time of publication of my previous paper I was in southern Tanganyika and had the good fortune to see and collect several species of *Anagallis* myself. Certain observations made in the field are also included here.

A new section is proposed, to comprise two species, one previously undescribed and the other hitherto very little known. I have also included a generic description, emended to include these two species, which differ from the rest of the genus in having only 2–3 ovules and 1-seeded indehiscent fruits. It might be argued that such an apparently fundamental difference should warrant their removal as a distinct genus, but I do not feel there are sufficient grounds for such action.

Throughout the paper the numbers prefixing the names of the species are those used in my original paper, additions being designated "3A", "3B", etc.

The specimens cited have all been examined and are deposited in the Kew Herbarium unless it is stated otherwise. I have used the standard abbreviations for designating the other herbaria from which I have seen specimens (see Lanjouw & Stafleu, Index Herbariorum (1954)) and where such specimens are also represented at Kew I have so indicated. Figures 3 and 4 were prepared for the "Flora of Tropical East Africa" and I am indebted to the editors of that work for being allowed to reproduce them here.

Anagallis L., Sp. Pl. 148 (1753) ; Benth. et Hook. f., Gen. Pl. **2**: 637 (1873); Pax et Knuth in Engl. Pflanzenr., Prim. 321 (1905); P. Tayl. in Kew Bull. 1955: 321 (1956).

Annual or perennial, terrestrial or rarely aquatic, glabrous herbs. Stems erect, decumbent, or prostrate and rooting at the nodes, terete, angled or winged. Leaves opposite (rarely abnormally verticillate) or alternate, sessile or shortly petiolate, entire, capillary to orbicular. Flowers pedicellate, solitary and axillary or in terminal racemes. Calyx deeply 5- (rarely 4-, 6- or more lobed); lobes ± lanceolate. Corolla rotate or subcampanulate, deeply 5- (rarely 4-, 6- or more) lobed; lobes suborbicular to narrowly oblong; apex rounded, denticulate or apiculate, sometimes gland-fringed, often persistent; red, blue, pink or white. Stamens inserted at the base of the corolla tube. Filaments connate at the base in a tube which may be equal in

*Supplementary to "The Genus Anagallis in Tropical and South Africa", P. Tayl. in Kew Bull. 1955: 321–350 (1956).

length to the corolla-tube and wholly adnate to it or longer than the corolla-tube and adnate to it only at the base. Free part of filaments filiform or ± dilated, glabrous or bearded with multicellular hairs. Anthers ± ovoid, obtuse or acute. Ovary globose; style filiform; stigma obtuse or subcapitate; ovules numerous or rarely 2–3, semi-anatropous. Capsule globose, circumscissile or rarely indehiscent. Seeds small, numerous, sub-trigonous or rarely 1 and globose.

Subgenus 1. Anagallis

1. Anagallis arvensis L., Sp. Pl. 148 (1753); P. Tayl. in Kew Bull. 1955: 329 (1956).

ssp. arvensis

Southern Rhodesia. Umtali District; Imbeza valley, farm lands, La Rochelle, 1200 m., 19 Oct. 1953, *Chase* 5145 (BM).
Angola. Huila; Leba, 1850 m., 30 July 1954, *Pritchard* 348 (BM).
Not previously recorded from either country.

Subgenus 2. Jirasekia (Schmidt) P. Tayl. in Kew Bull. 1955: 330 (1956).

Since the number of tropical and South African species comprising this subgenus is increased from 5 to 9 it seems desirable to include a new key.

Key to tropical and S. African species of Anagallis subgen. Jirasekia.

Ovules numerous; seeds numerous; capsule circumscissile; calyx lobes more than 2 mm. long:
Filaments connate at the base for a variable distance above the point of insertion on the corolla; plants prostrate or rarely erect sect. 1. Jirasekia
Erect plant; leaves alternate, filiform to linear; corolla lobes 6–7 mm. long; filaments bearded below . . . . . 2. *schliebenii*

Prostrate plants; leaves obovate to orbicular:
Leaves opposite; filaments bearded . . . . . 3. *huttonii*

Leaves alternate; filaments glabrous:
Pedicels 1–2 mm. long: free part of filaments longer than the connate part; corolla lobes 3-nerved, about as long as the calyx; leaves suborbicular . . . . . 3A. *brevipes*

Pedicels 20–30 mm. long; free part of filaments shorter than the connate part; corolla lobes 5-nerved, slightly longer than the calyx; leaves obovate . . . . . 3B. *gracilipes*

Filaments not connate at the base above the point of insertion on the corolla . . . . . sect. 2. Thorefriesia (spp. 4–6)

Ovules 2–3; seeds 1; capsule indehiscent; calyx lobes less than 1 mm. long sect. 3. Monosperma
Corolla 3–4 mm. long; filaments glabrous; leaves up to 5 mm. long and wide . . . . . 6A. *oligantha*

Corolla 5–8 mm. long; filaments bearded at the base of the free part; leaves up to 10 mm. long and wide . . . . . 6B. *kingaënsis*

Section 1. Jirasekia

3A. Anagallis brevipes P. Tayl. sp. nov. *A. huttonii* Harv. affinis; foliis alternis floribus minoribus filamentisque glabris differt.

Herba repens, perennis, omnino glabra. *Caules* e nodis radices emittentes, circiter 1 mm. crassi, leviter angulares, ramosi, usque ad 15 cm. longi; internodia 1–3 mm. longa. *Folia* alterna, integra, late obovata vel suborbiculata, apice rotundata, leviter apiculata, basin versus cuneata, petiolo 1–2 mm. longo, lamina usque ad 7 mm. longa et usque ad 5 mm. lata. *Flores* ex axillis superioribus exorientes, breviter pedicellati, pentameri. *Pedicelli* graciles, 1–3 mm. longi, sub anthesin erecti, postea reflexi. *Calyx* fere ad basin divisus, lobis anguste lanceolatis acutis carinatis. *Corolla* subcampanulata, rosea, tubo brevissimo circiter 0·4 mm. longo, lobis anguste oblongis apice rotundatis 3–3·5 mm. longis 0·6–0·7 mm. latis 3-nerviis. *Stamina* isomera; filamenta glabra, circiter 2 mm. longa, basi in tubum connata, tubo 0·8 mm. longo, parte filamentorum libera filiformi; antherae ovatae, circiter 0·25 mm. longae. *Ovarium* globosum, circiter 0·7 mm. diametro, stylo filiformi circiter 1·8 mm. longo. *Pyxidium* globosum, circiter 2 mm. diametro, stylo persistente. *Semina* trigona, minute papillosa, 0·6–0·7 mm. longa.

Tanganyika. Southern Highlands Province; Rungwe District; Upper Fishing Camp, Kiwira River, locally common in damp or wet places on banks and in open places in grassland or rounded hill-slopes on rotted pumice or in black or grey loams of volcanic origin, 2250 m., 25 Oct. 1947, *Greenway & Brenan* 8278:—a perennial procumbent herb up to 2·5 cm. tall with small and delicate pale pink flowers. (K, holotype, EA, isotype); ibid., in boggy ground with *Cyperaceae* etc. 25 Oct. 1947, *Brenan & Greenway* 8214:—stems prostrate; leaves pale yellowish green; flowers pink; corolla hardly exceeding sepals; fruit subglobose, pale green.

Most closely related to *A. huttonii* Harv. and to *A. gracilipes* P. Tayl. It differs from the former in having alternate leaves and glabrous filaments and from the latter in its very short pedicels, in leaf shape and by the filiform part of the filaments being longer than the connate part. In general appearance it closely resembles some forms of *A. serpens* ssp. *meyeri-johannis* but it may be readily distinguished by the narrow corolla lobes and of course the connate filaments. (See Fig. 1, 6–10).

3B. Anagallis gracilipes P. Tayl. sp. nov. *A. brevipedi* P. Tayl. affinis; floribus pedicellisque majoribus, filamentis ultra medium connatis differt.

Herba repens, perennis, omnino glabra. *Caules* graciles e nodis radices emittentes, circiter 0·5 mm. crassi, simplices vel raro ramosi, usque ad 15 cm. longi; internodia 2–10 mm. longa. *Folia* alterna, integra, obovata, apice subacuta, basi in petiolum brevem 1–2 mm. longum cuneata, lamina usque ad 10 mm. longa et 5 mm. lata. *Flores* longe pedicellati, pentameri. *Pedicelli* graciles, sub anthesin erecti, fructu reflexi usque ad 3 cm. longi. *Calyx* fere ad basin divisus, lobis anguste lanceolatis acutis 3-nervosis 3–4 mm. longis. *Corolla* subcampanulata, tubo circiter 0·3 mm. longo, lobis anguste lanceolatis apice rotundatis vel subacutis 4–5 mm. longis circiter 1·5 mm. latis 5-nervosis. *Stamina* isomera; filamenta glabra, circiter 2·5 mm. longa tubo circiter 2 mm. longo incluso; pars filamentorum libera filiformis; antherae ovoideae, circiter 0·5 mm. longae. *Ovarium* globosum, circiter 0·6 mm. diametro, pluri-ovulatum, stylo filiformi 3 mm. longo. *Pyxidium* globosum, 2–3 mm. diametro. *Semina* trigona, minute papillosa, 0·9–1·0 mm. longa.

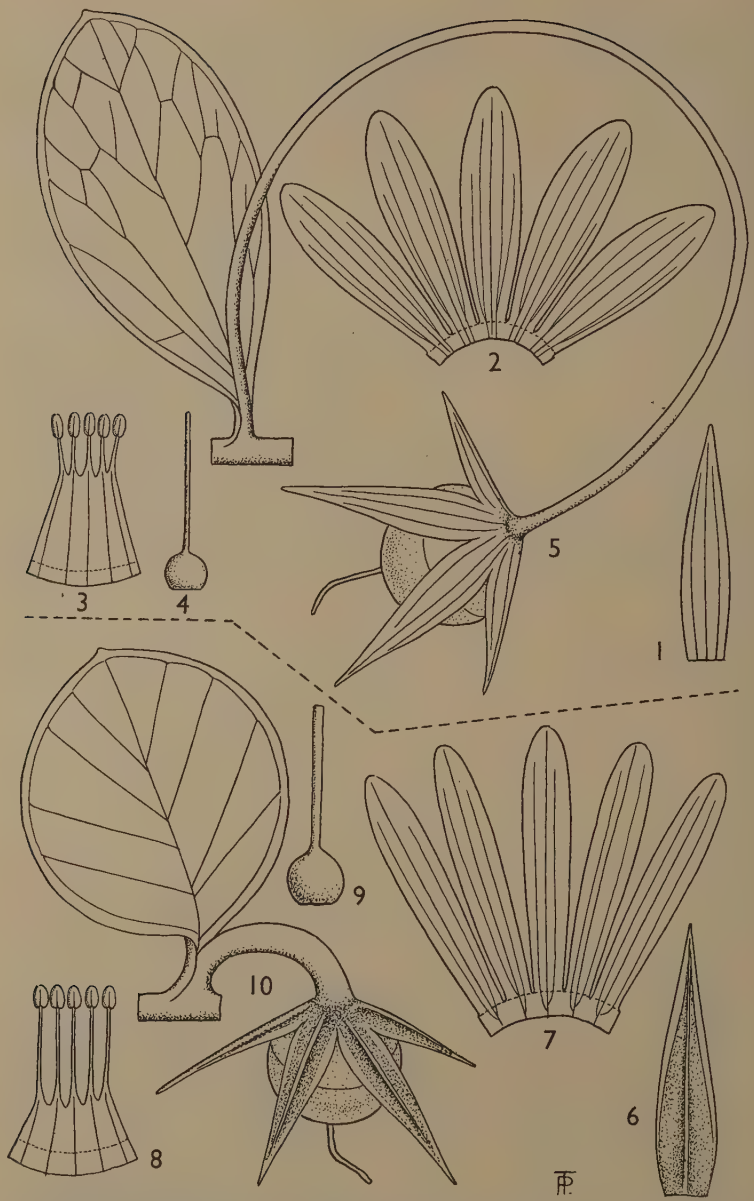


FIG. 1. *Anagallis gracilipes* P. Tayl.—1, calyx lobe; 2, corolla opened out; 3, stamens opened out; 4, pistil; 5, node with leaf and fruit, all × 8. *Anagallis brevipes* P. Tayl.—6, calyx lobe; 7, corolla opened out; 8, stamens opened out; 9, pistil, all × 12; 10, node with leaf and fruit, × 8.

Southern Rhodesia. Eastern Division; Umtali District; Engwa, 1980 m., prostrate in marsh, 8 Feb. 1955, *Exell, Mendonça & Wild* 304 (BM, holotype, SRGH, isotype).

This species agrees with *A. brevipes* in having alternate leaves and glabrous filaments but differs markedly in its very long slender pedicels, its unkeeled entirely foliaceous 3-nerved sepals, its broader corolla lobes and in its filaments, the connate part of which exceeds the free part. This last character is shared with no other species of *Anagallis*. In *A. filiformis* Cham. & Schlecht. the connate and free parts are more or less equal in length but the former is always densely bearded. (See Fig. 1, 1–5).

6. Anagallis hexamera P. Tayl. in Kew Bull. 1955: 339 (1956).

Ethiopia. 48 km. from Addis Ababa, Mulu, 2400 m., May 1951, *Curle* 63 (BM).
Kenya. Masai Province; SW. Mau Forest, 2460 m., Jan. 1957, *Whittall* 300.
Tanganyika. Southern Highlands Province; Mbeya District; Chunya Escarpment, 2250 m., 20 Jan. 1957, *Richards* 7937.

Of the above additional records the last is of great interest, extending as it does the range of the species southwards from near the equator to almost 9° S.

Section 3. Monosperma P. Tayl. sect. nov. Ovula 2–3; fructus indehiscens, 1-spermus, pedicello elongato reflexo, in terram penetrans.

6A. Anagallis oligantha P. Tayl. sp. nov. *A. kingaënsi* Engl. affinis ; foliis et floribus minoribus filamentisque glabris differt.

Anagallis (*subgen. Jirasekia, sect. Jirasekia*) *sp.* P. Tayl. in Kew Bull. 1955: 349 (1956).

Herba repens, perennis, omnino glabra. *Caules* e nodis radices emittentes, circiter 1 mm. crassi, simplices vel raro ramosi, usque ad 5 cm. longi; internodia circiter 1 mm. longa. *Folia* alterna, integra, late obovata vel suborbiculata, apice leviter apiculata, basin versus cuneata, petiolo 0·5–1 mm. longo, lamina usque ad 5 mm. longa et 5 mm. lata. *Flores* breviter pedicellati, pentameri. *Pedicelli* subanthesin erecti, usque ad 1 mm. longi, fructu reflexi usque ad 6 mm. longi. *Calyx* fere ad basin divisus, lobis lanceolatis acutis vix manifeste 1-nerviis circiter 1 mm. longis. *Corolla* subcampanulata, tubo 0·6–0·8 mm. longo, lobis oblongis apice obtusis vel subacutis 2–3 mm. longis circiter 1 mm. latis 3-nerviis. *Stamina* isomera; filamenta glabra, 1·8–2·2 mm. longa, basi in tubo connata, tubo circiter 0·8 mm. longo, parte filamentorum libera filiformi; antherae ovoideae, circiter 0·25 mm. longae. *Ovarium* globosum, circiter 0·4 mm. diametro, stylo filiformi circiter 1·3 mm. longo; ovulae 2–3. *Fructus* (immaturus) 1-spermus, circiter 1 mm. diametro indehiscens.

Nyasaland. Mt. Mlanje, *McClounie* s.n. (comm. *Johnston* 1896); ibid., Lake Ruo Plateau, 1740 m., common low creeping herb adpressed to peaty streambanks, 16 Aug. 1957, *Newman & Whitmore* 454:—leaves yellow-green; corolla white; flowers uncommon and tending to fall off. (BM, holotype).

Closely related to *A. kingaënsis* but differing in the very much smaller size of all its parts and in having glabrous filaments. (See Fig. 2, 9–12).

6B. Anagallis kingaënsis Engl. in Engl. Bot. Jahrb. **30**: 371 (1901); P. Tayl. in Kew Bull. 1955: 348 (1956).

Tanganyika. Kinga Mountains, Kipengere Ridge, streambanks, 2200 m., 1899, *Goetze* 958 (B, holotype destroyed, BR, isotype). Rungwe District; Upper Fishing Camp, Kiwira

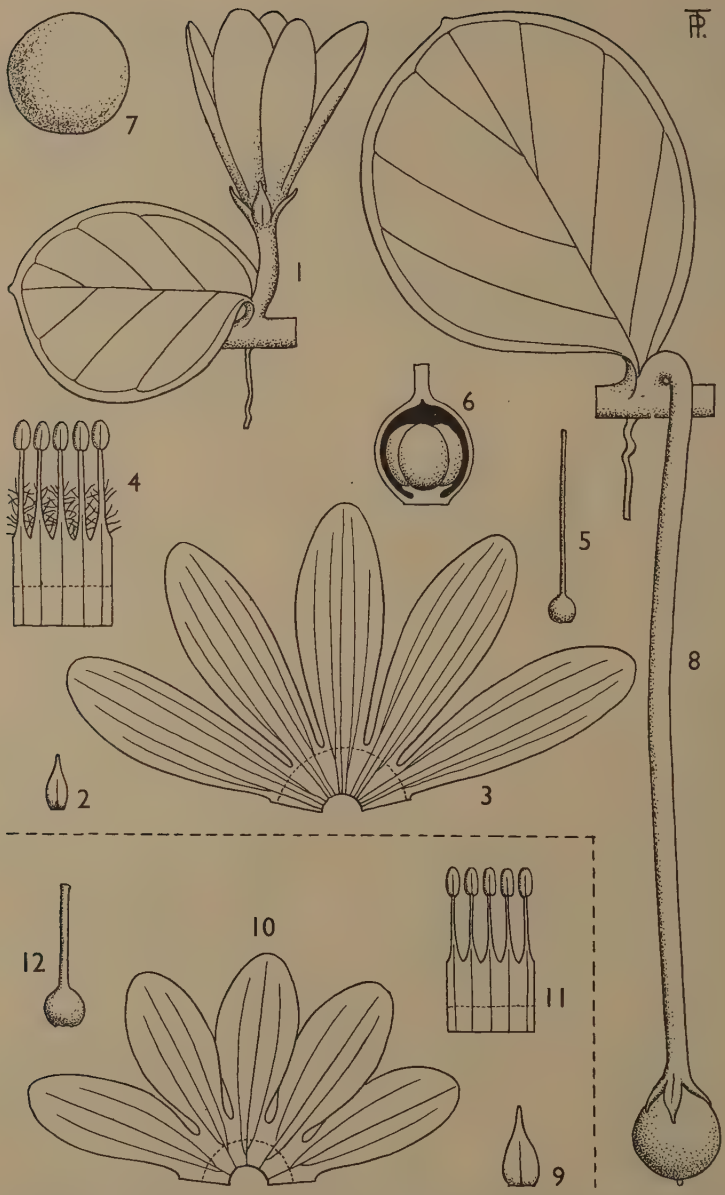


FIG. 2. *Anagallis kingaënsis* Engl.—1, node with leaf and flower; 2, calyx lobe; 3, corolla opened out; 4, stamens opened out; 5, pistil, all × 8; 6, ovary, × 60; 7, seed, × 12; 8, node with leaf and fruit, × 8. *Anagallis oligantha* P. Tayl.—9, calyx lobe; 10, corolla opened out; 11, stamens opened out; 12, pistil, all × 12.

River, not common in small patches on ditch faces in wet rotting pumice in association with *Drosera* in *Helichrysum fruticosum–Exotheca–Themeda* grassland on yellowish brown volcanic soil in very hilly country about 2100 m., 12 Aug. 1949, *Greenway* 8420 (EA, K):—a perennial procumbent herb with small solitary pink flowers, somewhat fleshy rounded leaves and crimson stems rooting at the nodes. Njombe District; Elton Plateau, Ndumbi River, in large patches on steep banks of stream, creeping and closely clinging to soil; looking just like *Anagallis tenella*, 2400 m., 19 Oct. 1956 (also seen in flower in June) *Richards* 6574. Ibid., 14 May 1957, *Richards* 9674.

In my previous paper this species was placed under "Imperfectly known species" as I was unable to see any specimens and the description was rather inadequate. I am greatly indebted to Professor W. Robyns for pointing out to me that an isotype existed in the herbarium at Brussels and for allowing me to borrow and examine it. About the same time a fine collection of this species was received from Dr. P. J. Greenway of the East African Herbarium and shortly afterwards yet another collection was made by Mrs. H. M. Richards. This latter material was in flower only, but at my request she returned and collected fine material in fruit. As the original description is rather inadequate I have drawn up the following description of this most interesting plant based on the collections cited above.

Perennial glabrous herb; stems prostrate, reddish-purple, about 1 mm. thick, rooting at the nodes, simple or branched, up to 4 dm. long and forming ± dense mats. Leaves alternate, suborbicular or broadly obovate, rounded at the apex, cuneate at the base, shortly petiolate, rather fleshy; petiole up to 3 mm. long, lamina up to 10 mm. long and 8 mm. broad. Internodes 2–6 mm. Flowers solitary, axillary, rather few, shortly pedicellate. Pedicels at anthesis erect and about 1 mm. long. Calyx segments 5, ovate, acuminate, 1-nerved, about 1 mm. long. Corolla subcampanulate, pink, tube 0·5–1 mm. long, lobes 5, oblong, rounded at the apex, 5–7-nerved, 3·5–6·5 mm. long, Filaments connate and bearded in the lower half, filiform and glabrous above, 2·5–4·5 mm. long. Anthers ovoid, about 0·5 mm. long. Ovary globose, about 0·3 mm. in diameter; ovules 2–3. Style filiform, as long as the stamens. Fruit indehiscent, 1-seeded, globose or pyriform, the pedicel elongating up to 18 mm., thickening, reflexing and becoming buried in the ground as the fruit ripens. Seed almost globose, somewhat compressed laterally, smooth, about 1·5 mm. in diameter.

This species is quite remarkable and differs from all other *Anagallis* but *A. oligantha* (supra) in the nature of its fruits. *Richards* 9674 was collected complete with a layer of soil some 15 mm. thick and fruits were projecting from the *lower* side of this, showing beyond any doubt that this species is truly geocarpic. (See Fig. 2, 1–8).

Subgenus 3. CENTUNCULUS (L.) P. Tayl. in Kew Bull. 1955: 340 (1956).

7A. Anagallis hurneri Hess in Berichte der Schweizerischen Botanischen Gesellschaft 67: 80 (1957).

BELGIAN CONGO. Lukumbi, about 100 km. N. of Lake Moero, *Hürner* 58 (Z, holotype not seen).

This species is very closely related to *A. kochii* Hess and is more or less identical in habit and in its vegetative parts. The flowers of *A. hurneri* however are only about 5 mm. in diameter (those of *A. kochii* are 10–15 mm. in diameter). Dr. Hess reports (l.c.) that he has recovered a further gathering of *A. kochii* from another locality in Angola some 350 km. N.W. of the *locus classicus* of that species.

10. Anagallis acuminata Welw. ex Schinz in Bull. Herb. Boiss. **2**: 221 (1894); P. Tayl. in Kew Bull. 1955: 341 (1956).

TANGANYIKA. Songea District; valley near R. Mtanda about 9·5 km. SW. of Songea, at edge of drying up pool among grasses, *Emilia* sp. and *Rotala* sp. in very wet soil but not now actually in water; also in water up to 3 cm. deep, 990 m., 21 June 1956, *Milne-Redhead & Taylor* 10856 (B, BR, EA, K, LISU, SRGH, UP):—erect annual; stem relatively thick, red below, pale green above; leaves green, the lower ones turning yellowish and dying; top of stem, pedicels and calyx green with very fine purple longitudinal dashes; corolla lobes white with very fine pale mauve veins inside, filaments and style pale dull mauve ; hairs on filaments whitish ; anthers blackish ; pollen green; ovary pinkish brown ; flowers open wide in sunshine at 3 p.m.

Previously recorded only from the Rhodesias and Angola.

11. Anagallis rhodesiaca R. E. Fries, Wiss. Ergebn. Schwed. Rhod. Congo Exped. 1911–12, **1**: 253 (1916); P. Tayl. in Kew Bull. 1955: 342 (1956).

TANGANYIKA. Songea District; Kwamponjore Valley, about 9·5 km. SW. of Songea in about 8 cm. of water (only recently much deeper when plant would have been totally submerged for several months), in pan on "laterite", 1000 m., 19 June 1956, *Milne-Redhead & Taylor* 10836 (B, BR, EA, G, K, LISU, P, SRGH, UP):—erect annual; stems below rather thick and fleshy, ± terete, pale green, above red or entirely green, lowest leaves reflexed, others spreading or first ascending, under water at time of flowering, the lowermost gland tipped; pedicels and calyx pale green; corolla lobes deep pink; ovary green tinged purplish; style purple; filaments deep pink; anthers bright yellow; corolla persisting in fruit; ibid., valley near R. Mtanda about 9·5 km. SW. of Songea, at edge of drying up pool among grasses, *Emilia* sp. and *Rotala* sp., in 5–8 cm. of water; occasionally growing with *Anagallis acuminata* in about 3 cm. of water where the two spp. meet, 990 m., 21 June 1956, *Milne-Redhead & Taylor* 10858 (B, BR, EA, K, LISU, UP):—plants similar to No. 10836; flowers open in sunshine at 3 p.m. but not flatly expanded.

Hitherto only known from the type gathering from Northern Rhodesia.

12. Anagallis tenuicaulis Bak. in Journ. Bot. **20**: 172 (1883); P. Tayl. in Kew Bull. 1955: 342 (1956).

TANGANYIKA. Songea District; 12 km. E. of Songea by Nonganonga stream, on grey soil in seasonally flooded grassland, 1050 m., 27 Dec. 1955, *Milne-Redhead & Taylor* 7767:—decumbent or weakly erect perennial; stems 4-angled, reddish below, green above; leaves mostly opposite, spreading below, more or less erect above, fleshy, margins recurved; calyx green tinged reddish, spreading; corolla white; ovary red; style mauve; filaments pale mauve with white hairs below; anthers dull yellow; fruits dull red; corolla sub-persistent.

This species was previously only doubtfully recorded from Tanganyika. In my previous paper I stated that I suspected that it was perennial and an examination of the plant in the field proves that this is so.

13. Anagallis pumila Sw., Prodr. Veg. Ind. Occ. **1**: 40 (1788); P. Tayl. in Kew Bull. 1955: 342 (1956) pro max. parte excl. var. *djalonis* (A. Chev.) P. Tayl.

var. α pumila

TANGANYIKA. Southern Highlands Province; Iringa District; just N. of Iringa township in damp sandy ground, now drying up, in secondary grassland, 1600 m., 13 July 1957, *Milne-Redhead & Taylor* 11138 (partly–mixed with var. *barbata*). Southern Province; Songea District; about 1·5 km. S. of Gumbiro in *Brachystegia–Acacia* grassland on waterlogged clay soil in mud by a rivulet, 880 m., 29 March 1956, *Milne-Redhead & Taylor* 9424; ibid., about 6·5 km. W. of Songea in damp sandy ground between *Brachystegia–Uapaca* woodland and boggy grassland, 990 m., 28 Apr. 1956, *Milne-Redhead & Taylor* 9846; ibid. further material of 9846 in fruit, 13 June 1956, *Milne-Redhead & Taylor* 9846A:—growing with var. *barbata*. ibid., by Lumecha Bridge N. of Songea in shallow soil overlying rocks by riverside, now merely damp, at height of rains completely submerged, 930 m., 4 May 1956, *Milne-Redhead & Taylor* 9893:—growing with var. *barbata* and a few intermediate forms (see note *infra*).

var. β barbata P. Tayl. in Kew Bull. 1955: 345 (1956).

Tanganyika. Southern Highlands Province; Iringa District; just N. of Iringa township, 1600 m., 13 July 1956, *Milne-Redhead & Taylor* 11138 (partly–mixed with var. *pumila*). Southern Province; Songea District; waterfall on R. Luhira N. of Songea in damp or shallowly submerged soil overlying rock, 1030 m., 18 March 1956, *Milne-Redhead & Taylor* 9235, & 25 April 1956, 9235A; ibid. 6·5 km. W. of Songea, further material of 9235 and 9235A in fruit, 13 June 1956, *Milne-Redhead & Taylor* 9235B:—growing with var. *pumila*; ibid., by Lumecha Bridge N. of Songea, 4 May 1956, *Milne-Redhead & Taylor* 9894:—growing with var. *pumila* and a few intermediate forms (see note *infra*).

Nyasaland. Southern Province; Ncheu District; Lower Kirk Range, Chipusiri, 1480 m., 17 March 1955, *Exell, Mendonça & Wild* 933 (BM).

Not previously recorded from Nyasaland.

As can be seen from the specimens cited above I found in Southern Tanganyika both pure populations of each variety and mixed populations where the two varieties were present (usually as adjacent patches pure of each variety rather than intimately mixed plants of both varieties). In the mixed populations a little searching almost invariably revealed a few plants which were of a more or less intermediate nature. In one locality comparative notes were made on the spot as follows:—

var. *pumila* (M.-R. & T. 9893). "Annual, erect to 1·5 dm., simple or branched; stem soft, 4 angled (at least below) ± reddish below, pale green above; leaves spreading, opposite below, alternate above; reddish in lower part of stem, pale green in upper; pedicels ascending, green; longer than subtending leaf; calyx green, petals white; ovary style and filaments purplish; filaments glabrous; anthers cream; ovary with numerous orange glands; corolla subpersistent becoming pale orange-brown in fruit; flowers open only in bright sunlight; leaves narrowly lanceolate".

var. *barbata* (M.-R. & T. 9894). "As 9893 but leaves ovate, relatively much shorter and broader; corolla considerably longer; filaments densely bearded; pedicels somewhat shorter and thicker".

intermediate between vars. *pumila* and *barbata* (M.-R. & T. 9894A). "Corolla of intermediate length; filaments sparsely bearded; leaves of intermediate width; a few plants only amongst thousands of the two varieties".

The leaf-width character was quite constant in the Songea District, broad leaves always being associated with bearded filaments and long corollas, narrow leaves with short corollas and glabrous anthers. However a re-examination of the material from the rest of Africa shows that this is not always or even usually so and by using long corolla with bearded filaments and short corolla with glabrous filaments as the diagnostic character both varieties have broad and narrow leaved forms. I still feel therefore that varietal rank is the most convenient for these two entities.

Having become quite familiar with the above two varieties in the field I was then most fortunate in finding var. *djalonis*. The appearance of the plant in the field and a re-examination of the herbarium material including several sheets additional to those cited in my original paper in this case induce me to restore it to specific rank.

13A. Anagallis djalonis A. Chev. in Journ. de Bot. sér. 2, **22**: 115 (1909).

Anagallis pumila Sw. var. *djalonis* (A. Chev.) P. Tayl. in Kew Bull. 1955: 346 (1956).

Tanganyika. Southern Highlands and Southern Provinces; Njombe and Songea Districts; Lukumburu in damp sand at bottom of roadside ditch on both sides of the river which forms the boundary between Njombe and Songea Districts, 1095 m., 6 July 1956, *Milne-Redhead & Taylor* 10748 & 10750.

The differences between the present species and *A. pumila* are set out below in the form of a key.

Plant simple or branched above; flowers in terminal racemes occupying the upper half of the stem or branches; leaves sessile, narrowly elliptic to broadly ovate, base cuneate to subtruncate, apex acute; corolla equal in length to or exceeding the calyx; filaments filiform; seeds 0·3–0·45 mm. long . . . . . 13. *A. pumila*

Plant simple or branched from the base; flowers axillary almost to the base of the stem; leaves petiolate, obovate-spathulate, apex rounded or acute; corolla shorter than the calyx; filaments dilated and flattened; seeds 0·45–0·6 mm. long . . . . . 13A. *A. djalonis*

Generally a shorter, much more compact plant than *A. pumila*, it appear to grow only at altitudes above 1000 m., whilst *A. pumila*, in Africa and elsewhere, occurs down to sea level.

2. The genus Lysimachia (sect. Ephemerum subsect. Spicatae).

Knuth* recognises six species in this section of *Lysimachia* as occurring in Tropical Africa, South Africa and Madagascar. A careful examination of the criteria he uses for separating these species leads me to reduce this number to two, *L. volkensii* Engl. and *L. ruhmeriana* Vatke.

Fortunately type specimens of all the species reduced to synonymy are deposited in the Kew Herbarium. In addition I have been able to examine a large number of specimens in the Kew and British Museum herbaria, most of which are cited below. When I have seen several specimens from the same locality I have, in some cases, not cited all of them.

Pedicels less than 5 mm. long; styles about 1 mm. long, rarely up to and never exceeding 1·5 mm.; leaves usually elliptic but variable in shape, petiolate or sessile, surface provided with numerous conspicuous punctate glands . . . . . 1. *L. ruhmeriana*

Pedicels 10–20 mm. long; styles more than 2 mm. long; leaves lanceolate, sessile, always more or less auriculate at the base, surface without punctate glands . . . . . 2. *L. volkensii*

1. Lysimachia ruhmeriana Vatke in Linnaea **40**: 204 (1876); Oliv. in Fl. Trop. Afr. **3**: 489 (1877); Pax et Knuth in Engl. Pflanzenr., Prim. 292 (1905).

Lysimachia parviflora Bak. in Journ. Linn. Soc. Bot. **20**: 196 (1883); Pax et Knuth, l.c. 291; Harv. in Dyer, Fl. Cap. **4, 1**: 428 (1909).

Lysimachia africana Engl., Pflanzenw. Ost.-Afr. **C**: 304 (1895); F. W. Andr., Fl. Sudan. **3**: 66 (1956); Pax et Knuth, l.c. 291 (1905); Robyns, Fl. Parc Nat. Alb. **2**: 40 (1947); Knuth et Mildbr. in Mildbr., Wiss. Ergebn. Deutsch. Zentr.-Afr.-Exped. 1907–8, **2**: 518 (1913).

Lysimachia saganeitensis Schweinf. ex Knuth in Pax et Knuth, l.c. 292 (1905).

Lysimachia woodii Schltr. ex Knuth in Pax et Knuth l.c. 292 (1905); Harv. in Dyer, Fl. Cap. **4,** 1: 427 (1909).

*R. Knuth in Pax et Knuth in Engler, Das Pflanzenreich, Primulaceae, 291–2 (1905).

FIG. 3. *Lysimachia ruhmeriana* Vatke—1, leaves and part of lower stem, × 1; 2, surface of leaf, × 5; 3, part of inflorescence, × 1; 4, bract, × 8; 5, flower, × 8; 6, margin of calyx lobe, × 80; 7, corolla opened out, × 10; 8, anther, × 20; 9, pistil, × 10; 10, fruit, × 8; 11, seed, basal view, × 30; 12, transverse section of seed, × 30.

British Cameroons. Bamenda, 1500 m., Apr. 1931, *Maitland* 1406; ibid., 26 May 1951, *Ujor* in F.H.I. 30383.

Belgian Congo. Kikomero, 1850 m., Nov. 1937, *Lebrun* 8468 (BR, K). Rutshuru, Nov. 1937, *Lebrun* 8231 (BR, K).

Sudan Republic. Imatong Mts., Lomuleng, 2400 m., 30 Dec. 1935, *A. S. Thomas* 188 (BM, K); ibid., 2610 m., 26 July 1939, *Myers* 11601.

Ethiopia. *Schimper* 1231 (B, holotype destroyed, BM, K, isotype). Mt. Chillalo, 2700 m., Nov. 1926, *Scott* s.n. Addis Allem, 2400 m., 20 Sept. 1926, *Omer-Cooper* s.n. Gara Mulata Mt. 2820 m., 4 March 1933, *Gillett* 5351.

Eritrea. Saganeiti, 2100–2300 m., 17 Apr. 1892, *Schweinfurth & Riva* 1684 (B, holotype destroyed, K, isotype of *L. saganeitensis*).

Uganda. Western Province; Ruwenzori, Nawamba Valley, 1350 m., 15 Jan. 1935, *G. Taylor* 3120 (BM). Fort Portal, 2100 m., 7 Apr. 1932, *Hazel* 236. Kigezi District; Kachwekano Farm, 1920 m., June 1951, *Purseglove* 3652 (EA, K). Eastern Province; Mt. Elgon, 2700 m., 4 Sept. 1932, *A. S. Thomas* 527; Kamuli, 1080 m., 27 May 1953, *Wood* 764 (EA, K). Bugishu, 1300 m., Jan. 1932, *Chandler* 514. Buganda Province; Kampala, 1170 m., 4 Sept. 1935, *Hancock & Chandler* 29; Entebbe 1200 m., July 1931, *Lab. Staff* 2163; Kipayo, 1200 m., Oct. 1913, *Dummer* 284.

Kenya. Rift Valley Province; Aberdare Mts., 3000 m., *Battiscombe* 546 (EA, K). E. Mau Forest Reserve, 2750 m., 28 Aug. 1949, *Maas Geesteranus* 5940; Soy, *Brodhurst Hill* 424 (EA,K). Mt. Elgon, 2460 m., Dec. 1930, *Lugard* 317. Central Province; Mt. Kenya, 2300 m., 27 Dec. 1921, *R. E. & Th. C. E. Fries* 403. Chyulu, 1650 m., 2 May 1938, *Bally* 7669. Nyanza Province; Trans Nzoia District, 3360 m., 22 Feb. 1935, *G. Taylor* 3559 (BM, EA). Tindoret Forest Reserve, 2200 m., 6 July 1949, *Maas Geesteranus* 5394. Masai Province; Ngong Hills, 2190 m., 9 July 1939, *Bally* 62 (partly) (EA).

Tanganyika. Lake Province; Ukerewe Island, 1928–1929, *Conrads* in E.A.H. 10247 & 10248. Northern Province; Kilimanjaro, 1500 m., 31 July 1912, *Grote* 5081 (EA); ibid., 2550 m., 27 Feb. 1934, *Greenway* 3832; Moshi District, Lyamungu, 1290 m., 27 Oct. 1943, *Wallace* 1070; Mt. Meru, 2490 m., 29 Sept. 1932, *Burtt* 4111; Tanga Province; Pare District, Usangi, 1350 m., Oct. 1927, *Haarer* 832; Lushoto District, Mkuzi, 1600 m., 23 April 1953, *Drummond & Hemsley* 2210; ibid., Kwa Mstuza, Aug. 1893, *Holst* 9013a (B, holotype destroyed, K, isotype of *L. africana*). Southern Highlands Province; Njombe District, Ndumbe Forest, Feb. 1954, *Paulo* 254; ibid., Mkenja village, 2100 m., 14 Jan. 1957, *Richards* 7793; Kyimbila, 8 March 1911, *Stolz* 632. Southern Province; Songea District, about 11 km. W. of Songea, 960 m., 14 Feb. 1956, *Milne-Redhead & Taylor* 8694; ibid., Matengo Hills, about 8 km. N. of Miyau, 1575 m., 1 March 1956, *Milne-Redhead & Taylor* 8780.

Portuguese East Africa. Manica e Sofala; Concelho de Manica District, Tsetsera, 2100 m., 4 March 1954, *Wild* in S.R.G.H. 45831.

Nyasaland. Nyika Plateau, 1200–1800 m., 1896 *Whyte* s.n.

Southern Rhodesia. Inyanga, 1920 m., 25 Oct. 1946, *Wild* in S.R.G.H. 16045; ibid., 1800 m., 26 Jan. 1951, *Chase* in S.R.G.H. 32591. Umtali, 1500 m., 28 Nov. 1951, *Chase* in S.R.G.H. 35511; ibid., 21 Nov. 1955, *Chase* in S.R.G.H. 5869.

Angola. Benguela; between Ganda and Caconda, 1700 m., Dec. 1933, *Hundt* 773 (BM). Cuanza Sul, Capir, 900 m., 8 Jan. 1933, *Gossweiler* 9964 (BM).

Transvaal. Mac Mac, *Mudd* s.n. Valdezia, 600 m., 21 Feb. 1894, *Schlechter* 4533. Hangklip, 1200 m., 25 Dec. 1945, *Gerstner* 5751. Zoutpansberg, 1200 m., 27 Feb. 1919, *McCallum* s.n.

Natal. Near Van Reenens Pass, 16 Dec. 1891, *Wood* 4522 (B, holotype destroyed, K, isotype of *L. woodii*). Dumisa, 790 m., 23 Jan. 1911, *Rudatis* 1314. Bergville District, 2040 m., 1 Dec. 1950, *Killick* 1180.

Madagascar. *Baron* 2303 & 3320 (K, syntypes of *L. parviflora*), *Baron* 654 & 1816. Jan. 1889, *Scott Elliot* 1928.

2. Lysimachia volkensii Engl., Pflanzenw. Ost-Afr. **C**: 304 (1895); Pax et Knuth, Prim. 291 (1905).

Kenya. Rift Valley Province; Laikipia, *Scoresby-Routledge* s.n.; E. Mau Forest Reserve, 2300 m., Sept. 1949, *Maas Geesteranus* 6161. Central Province; Nanyuki, June 1943, *Moreau* 32 (EA, K). Nyanza Province; Sotik, 1800 m., June 1950, *Bally* 7833. Masai Province; Ngong Hills, 2250–2400 m., July 1930, *Napier* 508 (EA, K); ibid., 2160 m., Dec. 1932, *Rogers* 246 (BM, EA, K); ibid., July 1956, *Milne-Redhead & Taylor* 11308:—perennial herb with pink roots; stems reddish below, green above, decumbent; leaves spreading, green above, glaucous beneath; pedicels erect, elongating in fruit; calyx pale reddish purple; corolla pink; fruits green tinged reddish.

Tanganyika. Northern Province; Kilimanjaro, 1800 m., 23 Sept. 1937, *Cooper* 5 (BM); ibid., Marangu, 1200 m., July 1893, *Volkens* 533 (B, holotype destroyed, BM, K, isotype); Mbulu District, Mbulumbul, 1920 m., June 1945, *Greenway* 7472 (EA, K).

In order to facilitate an explanation of my reasons for reducing 5 species recognised by Knuth to one I reproduce his key as follows :

a. Spica laxa, racemo fere similis, pedicellis ad 1 cm. longis. Folia linearia. Stylus capsula longior . . . . . *L. volkensii*

b. Spica angusta. Folia lineari-lanceolata vel ovata. Stylus capsula brevior. Folia superior basi angustata.

I Corolla calyce 1½ plo longior . . . . . *L. parviflora*

II Corolla calycem longitudine fere aequans.

1. Folia tenuia, lanceolata vel ovata . . . . . *L. africana*

2. Folia fere coriacea, linearia vel lineari-lanceolata . *L. saganeitensis*

Folia superiora caulina basi semper semiamplexicaulia.

I Spica brevis, 4 cm. longa. Folia obtusa . . *L. ruhmeriana*

II Spica 10 cm. et ultra longa. Folia acuta . . . . *L. woodii*

The characters used in the above key for separating *L. volkensii* from the other species agree more or less with those used by me (with the exception that Knuth apparently failed to notice or attach any significance to the presence or absence of glands on the leaves). He next contrasts narrow leaf-bases with semiamplexicaule ones. Here there seems to be come correlation between leaf-base and geography. Most of the specimens I have seen from the southern part of the range (Natal, Transvaal and Southern Rhodesia) tend to have the upper leaves semiamplexicaul, and the type of *L. ruhmeriana* from Ethiopia has all the leaves semiamplexicaul. However some specimens (e.g. *Schlechter* 4533 and *Gerstner* 5751, both from the Transvaal) have both cuneate-petiolate and semiamplexicaul leaves on different shoots or even on the same shoot of the one plant, as has the type specimen of *L. saganeitensis* from Eritrea. The form of the leaf-bases is apparently not correlated with any other character. I have myself collected specimens with semiamplexicaul leaf-bases from southern Tanganyika (*Milne-Redhead & Taylor* 8780) and a specimen from further north (*Richards* 7793) has both leaf types on the same plant. The correlation with the geographical distribution seems to be too vague therefore to warrant their separation, under any taxonomic rank, the situation being in my view that the leaves are usually cuneate-petiolate but, with intermediate forms, may less commonly be semi-amplexicaul, especially in the southern part of the range.

The 3 species included under the division "*Folia superiora basi angustata*" are *L. parviflora*, distinguished by having a corolla longer in relation to the calyx than the other two, *L. africana* and *L. saganeitensis*, which are distinguished from each other on leaf texture and shape. I have examined the types of these last 3 species and in all the corolla is slightly longer than the calyx and the difference in leaf shape and texture between *L. africana* and *L. saganeitensis* is vague and scarcely specific.

The two species under the division "Folia . . . . . semi-amplexicaulia" are distinguished from each other by inflorescence length and leaf-apex. Many specimens of this species in herbaria consist of only branches removed from large plants and the inflorescence length varies according to the vigour of the branch. This is easily observed in many of the more complete specimens.

Lastly the nature of the leaf-apex seems to be as variable as the leaf-base and overall leaf shape, acute and obtuse leaves occurring together on many of the specimens examined. *L. ruhmeriana* as accepted here is a widespread

plant occurring over a wide range of altitude and in many different types of vegetation and it is not surprising that it should be somewhat variable. *L. volkensii* is confined to a comparatively small area in Kenya and Tanganyika and is much less variable. The two species grow together in at least one place in Kenya (Ngong Hills) but no specimens in any way intermediate have been seen from that locality. (See Fig. 3).

Imperfectly known species

Martin 209 (Kenya, Lake Rudolf Valley Exped. July 1934—labelled "from Marsabit or Kulal Mt., notes lost") may possibly represent a third tropical African species, or it may be a very abnormal form of *L. ruhmeriana*. It has the leaves of that species, pedicels elongating up to 15 mm. in fruit and filaments longer than the corolla lobes. In some ways, notably the exserted anthers, it resembles the eastern Mediterranean species *L. atropurpurea*. I feel it would be unwise to describe this as a new species based as it would be on a single plant of doubtful origin.

3. The genus Ardisiandra.

Ardisiandra Hook. f. in Journ. Linn. Soc. Bot. **7**: 205 (1864); Benth. et Hook. f., Gen. Pl. **2**: 633 (1873); Oliv. in Fl. Trop. Afr. **3**: 488 (1877); Pax et Knuth in Engl. Pflanzenr. Prim. 222; Hutch. et Dalz., Fl. W. Trop. Afr. **2**: 184 (1931); Weim. in Svensk Bot. Tidskr. **30**: 39 (1936).

Capsule with a translucent pericarp in the lower part, opening at the apex by 5 deltoid cartilaginous valves:

Corolla pink or mauve, 2–3 times as long as the calyx, lobes emarginate; peduncle up to 8 cm. long; racemes up to 10 flowered
1. *primuloides*

Corolla white, scarcely longer than the calyx, lobes rounded or truncate; peduncle up to 0·5 cm. long; racemes up to 5 flowered
2. *sibthorpioides*

Capsule with a translucent pericarp throughout, indehiscent; corolla white or pale pink about 1·5–2 times as long as calyx, lobes rounded or truncate; peduncle up to 1 cm. long; racemes up to 6 flowered
3. *wettsteinii*

1. Ardisiandra primuloides Knuth in Engl. Bot. Jahrb. **53**: 316 (1915); Weim. in Svensk Bot. Tidskr. **30**: 39 (1936).

Tanganyika. Southern Highlands Province; Rungwe District, Kibila Gorge, 1000 m., 7 Oct. 1911, *Stolz* 924 (B, holotype destroyed, K, UP, isotypes); ibid., Rungwe Mountain, 1700 m., 16 Sept. 1932, *Geilinger* 2365; ibid., Mbeya District, Kikondo, on steep sides of gorge amongst moss, washed by spray from large waterfall, 2250 m., 22 Oct. 1956, *Richards* 6714:— prostrate plant with pale mauve flowers.

The specimens collected by Mrs. Richards have stems up to 20 cm. long whilst those of the type and the Geilinger specimen are all under 5 cm. However the flowers and inflorescence are identical and I feel that the elongation is due to the shady and humid habitat. Both Knuth and Weimarck (ll. cc.) make much of the short stem of this species, using it as the diagnostic character and pointing out that in this way and in its comparatively large mauve flowers *A. primuloides* closely resembles the genus *Cortusa*. In the latter genus however the stem is always very short and the

inflorescence is umbellate, not racemose. *Cortusa* also differs from *Ardisiandra* in having the calyx lobed to half its length, not to the base, and the fruit is of a different shape and texture.

2. Ardisiandra sibthorpioides Hook. f. in Journ. Linn. Soc. Bot. **7**: 205 (1864); Oliv. in Fl. Trop. Afr. **3**: 488 (1877); Pax in Engl. et Prantl, Pflanzenfam. **4, 1**: 110 (1889); Pax et Knuth in Engl. Pflanzenr. Prim. 224 (1905), partim excl. spec. *Engler* 1741 et 1781; De Wild., Pl. Bequaert. **2**: 92 (1923) partim excl. spec. *Bequaert* 3706; Hutch. et Dalz., Fl. W. Trop. Afr. **2**: 184 (1931); Weim. in Svensk Bot. Tidskr. **30**: 39 (1936).

Ardisiandra engleri Weim. in Svensk Bot. Tidskr. **30**: 40 (1936); Staner in Ann. Soc. Scient. Brux. **56B**: 244 (1936); Robyns. Fl. Parc Nat. Alb. **2**: 37 (1947).

Ardisiandra engleri var. *microphylla* Weim. l.c. 41 (1936).

British Cameroons. Cameroon Mt., 2100 m. Dec. 1862, *Mann* 2022; ibid., 1000 m., *Preuss* 1038 (BM, K); ibid., Buea, 1905, *Deistel* 656; ibid., 2280 m., Feb. 1930, *Maitland* 1021:—a prostrate herb in the forest; ibid., Ukele, 1800 m., Feb. 1931, *Maitland* 1323: – under shade in woodland; ibid., Buea, 1050 m., 28 Aug. 1937, *Rosevear* Cam 101/37; ibid., 1100 m., *Schlechter* 12846 (BM, K).

Fernando Po. 2250 m., March 1862, *Mann* 1458:—corolla white (K, holotype).

Belgian Congo. Ruwenzori, 1600–1800 m., Apr. 1914, *Bequaert* 3569; ibid., 2800 m., Aug. 1932, *Hauman* 34 (fide Robyns l.c. 38). Mokoto-Mosisi, Dec. 1914, *Bequaert* 6341 (fide Staner l.c.)

Sudan Republic. Imatong Mts., Itibol, 1920 m., 20 Dec. 1935, *A. S. Thomas* 1712 (BM, K).

Ethiopia. Irriga Shafi, 1890 m., 18 Jan. 1953, *Gillett* 14835. Amaro Mts., Mt. Delo, 2880 m., 28 Jan. 1953, *Gillett* 14983.

Uganda. Kigezi District, Kachwekano Farm, 1920 m., Dec. 1951, *Purseglove* 3746 (EA, K); ibid., Amahinga, 1500 m., Nov. 1946, *Purseglove* 2246 (EA, K). Ruwenzori, Mihunga, 2100 m., 17 Jan. 1939, *Loveridge* 391; ibid., near Bwamba Pass, 2250 m., July 1940, *Eggeling* 4003; ibid., Namwamba Valley, 1950 m., 4 Jan. 1935, *G. Taylor* 2821 (BM).

Kenya. Aberdare Mts., Kinangop, 2640–2670 m., Apr. 1938, *Chandler* 2227.

Tanganyika. Usambara Mts., Amani, 900 m., 31 Dec. 1928, *Greenway* 1076 (K, EA); ibid., 1902, *Engler* 711 (B, holotype, of *A. engleri* destroyed); ibid., 27 Dec. 1905, *Braun* 811 (EA). Uluguru Mts., Towero, 1200 m., Sept. 1930, *Haarer* 1896 (EA, K); ibid., *Rounce* 599 (EA); ibid., Tanana, 1350 m., Feb. 1935, *E. M. Bruce* 824 (BM, K); ibid., 1400 m., 13 Feb. 1933, *Schlieben* 3441 (B, holotype destroyed, BM, isotype of *A. engleri* var. *microphylla*). Njombe District; Mahenge, 1000–1100 m., 23 March 1932, *Schlieben* 1953 (BM, K).

Weimarck (l.c.) distinguishes the east African plant (under the name *A. engleri*) from the west African plant chiefly on the nature of the calyx, maintaining that it is accrescent in *A. engleri* and not in *A. sibthorpioides*. I cannot agree with this and find that the calyces on specimens from both areas are equally accrescent. *A. engleri* var. *microphylla* is a small-leaved more densely pubescent form possibly induced by exposure. It is not in my opinion worthy of any taxonomic rank as it is connected by numerous intermediates with the typical form. (See Fig. 4, 12 and 13).

3. Ardisiandra wettsteinii R. Wagner in Anzeiger Akad. Wiss. Wien **69**: 185 (1932).

Ardisiandra orientalis Hutch. ex Weim. in Svensk Bot. Tidskr. **30**: 41 (1936); Robyns l.c. 38 (1947).

Ardisiandra orientalis var. *hirsuta* Weim. l.c. 44 (1936); Robyns l.c. (1947).

Ardisiandra stolzii Weim. l.c. 44 (1936).

[*Ardisiandra sibthorpioides* (non Hook. f.)—Mildbr. in Wiss. Ergebn. Deutsch. Zentr.-Afr.-Exped. 1907–1908 **2**: 517 (1913); Fries in Wiss. Ergebn.

FIG. 4. *Ardisiandra wettsteinii* R. Wagner—1, part of plant, × 1; 2, surface of leaf, × 4; 3, calyx, × 5; 4, cilia on margin of calyx lobes, × 30; 5, corolla opened out, × 5; 6, anther, back and front view, × 15; 7, pistil, × 10; 8, stigma, × 40; 9, fruit, × 5; 10, seed, lateral view, × 20; 11, seed, basal view, × 20. *A. sibthorpioides* Hook. f.—12, fruit, × 5; 13, seed, lateral view × 20.

Schwed. Rhod.-Kongo-Exped. 1911–1912 **1**: 253 (1916); De Wild. in Pl. Bequaert. **2**: 92 (1923) partim quoad spec. *Bequaert* 3706; Pax et Knuth in Engl. Pflanzenr. Prim. 224 (1905) partim quoad spec. *Engler* 1741 et 1781].

Belgian Congo. Shaheru, 2700 m., Jan. 1938, *Lebrun* 9373 (BR, K); Ninagongo, 2700 m., 16 Feb. 1927, *Linder* 2081 (BR, K); ibid., 1907, *Mildbraed* 1389 (B, syntype of *A. orientalis* var. *hirsuta* destroyed); Muhavura, 3000 m., Dec. 1907, *Mildbraed* 1840 (B, syntype of *A. orientalis* var. *hirsuta* destroyed). Robyns l.c. cites many more specimens from Ruwenzori and the Kivu area.

Uganda. Ruwenzori, Nyinabitaba Ridge, 2280 m., Aug. 1933, *Eggeling* 1390; ibid., Mihunga, 1950 m., Aug. 1931, *Fishlock & Hancock* 16. Virunga Mts., Muhavura, 2340 m., *Eggeling* 1028. Muhavura-Mgahinga saddle, 2850 m., Sept. 1946, *Purseglove* 2147 (EA, K).

Kenya. Mt. Kenya, 2350 m., 3 Jan. 1922, *R. E. & Th. C. E. Fries* 714 (K, syntype of *A. orientalis*). Aberdare Mts., 15 March 1922, *R. E. & Th. C. E. Fries* 2422 (K, syntype of *A. orientalis*); ibid., Karati plateau, 2550 m., Oct. 1933, *Albrechtsen* 2745 (EA, K). Teita District, Teita Hills, 1750 m., 13 Sept. 1953, *Drummond & Hemsley* 4284.

Tanganyika. Kilimanjaro; 3600 m., Feb. 1928, *Haarer* 1112 (EA, K); ibid., 1800–3000 m., 28 Feb. 1934, *Greenway* 3862 (K, neotype, EA, isoneotype). W. Usambaras, Bumbuli, 1750 m., 5 May 1953, *Drummond & Hemsley* 2486. Southern Highlands Province; Rungwe District, Mwakeleli, 2250 m., May 1953, *Eggeling* 6527 (EA, K); ibid., Tukuyu District, Mt. Rungwe, 2160–2490 m., March 11 1932, *St. Clair-Thompson* 859; ibid., Kyimbila, 1350 m., *Stolz* 167 (BM, holotype, UP, isotype of *A. stolzii*); ibid., Mbeya District, Poroto Mts., Ngozi Crater Lake, 2100 m., 1956, *Richards* 6462; ibid., Mbeya Mt., 2460 m., 13 May 1956, *Milne-Redhead & Taylor* 10238. Southern Province; Songea District, Matengo Hills, Lupembe, 1770–1860 m., 10 Jan 1956, *Milne-Redhead & Taylor* 8089 & 8089 A.

Southern Rhodesia. Chimanimani Mts., Mt. Peze, 1950 m., 15 Oct. 1950, *Wild* in S.R.G.H. 30539. Inyanga District, 2010 m., 19 Oct. 1946, *Wild* in S.R.G.H. 15928; ibid., Mare River, 1800 m., 21 Oct. 1946, *Wild* in S.R.G.H. 15982.

I am indebted to Mr. B. L. Burtt of the Royal Botanic Gardens, Edinburgh for pointing out the correct name for this species. Wagner's description is based on a cultivated plant, presumably at Vienna, grown from seeds collected by R. von Wettstein on Kilimanjaro. As there is no record of a specimen being preserved I am proposing a neotype (*Greenway* 3862 supra).

Seeds of this species under the name *A. wettsteinii* have recently been distributed from Jena botanic gardens and it is not improbable that these are descendants of the original seeds collected by von Wettstein, though this would be rather difficult to prove.

A. stolzii was distinguished by Weimarck as having 3- to 6-flowered inflorescences, those of *A. wettsteinii* (under the name *A. orientalis*) having 1–3 flowers. I have seen specimens from all parts of its range with 1- or 2- to 6-flowered inflorescences on the same plant. *A. orientalis* var. *hirsuta* seems to be a small more densely pubescent variant probably induced by exposure and not worthy of any taxonomic rank, numerous intermediate forms having been seen.

The fruit of this species differs from those of the other two in being indehiscent. In the field it looks superficially like a white strawberry (*Fragaria*), the pericarp being more or less transparent and the spongy white placenta and black seeds showing through. (See Fig. 4, 1–11).

Notes on Cyperaceae: XLII*

E. Nelmes

Additions to the Sedge Flora of Tanganyika.

In 1956 my colleagues, Mr. E. Milne-Redhead and Mr. P. Taylor, returned from southern Tanganyika with a large collection of plants, including numerous *Cyperaceae*. Species of *Scleria* were particularly well represented and this rather large genus had only recently been prepared for the Flora of Tropical East Africa. This rich material, including a new species, has been added to the account, thus modifying the descriptions, keys and distribution of various species.

Scleria longispiculata *Nelmes*, sp. nov.; affinis *S. welwitschii* C. B. Clarke sed inflorescentia haud ramosa, spicis longioribus, glumis femineis majoribus, achaeniis multo majoribus praecipue differt.—Type: *Milne-Redhead* and *Taylor* 9739 (K., holotype).

A tall and rather stout scaberulous plant 45–105 cm. high, with a thick and short rhizome. *Rhizome* horizontally creeping, 4–6 mm. thick, pale fulvous, clothed with sheathing scales. *Stems* 45–105 cm. tall, 1·5–2 mm. thick, scaberulous on the angles above, glabrous or villous on the sides. *Leaves* usually much shorter than the stems, 2·5–5 mm. wide, plicate to flattish, glabrous or villous, lower reduced to leafless sheaths, which are glabrous or villous, slightly rough, lower often dull reddish, mouth of sheath produced into a triangular or apically rounded, glabrous or villous tongue, 0·5–5 mm. long. *Inflorescence* 5–13 cm. long, composed of 4–8 sessile glomerules, each of 1–5 spikelets, upper glomerules about their own length apart, lower more longly spaced, erect or suberect, 2–10 mm. broad; *spikelets* 8–9 mm. long. *Bracteoles* glumiform with a long, smooth to minutely hispidulous awn, much shorter than to about as long as the glomerule. *Female glumes* 4–6 mm. long, minutely hispiduous, light greenish-brown, midrib excurrent in a minutely scaberulous awn 0·75–2 mm. long. *Achene* ovoid with a truncate base, obtusely trigonous, 3·5–4 mm. long, 2–2·75 mm. broad, shining whitish, smooth, very shortly beaked.

Tanganyika: Songea District; near R. Mtanda, about 9 km. S.W. of Songea, 990 m., in sandy ground in *Brachystegia–Uapaca* woodland, 25 March, 1956, *Milne-Redhead* and *Taylor* 9339; ibid., Kitai, in *Brachystegia–Uapaca* woodland on brown sandy loam, 900 m., 16 April, 1956, *Milne-Redhead* and *Taylor* 9739.

Besides the occurrence of this new *Scleria*, the extension of range of other species of the genus to Tanganyika is as follows:—*Scleria gracillima* Boeck. Known before only from the A. E. Sudan.—*S. tessellata* Willd. Found in other parts of Africa, Madagascar and India.—*S. dregeana* Kunth. Rather widespread in other parts of Africa.—*S. flexuosa* Boeck. Good specimens enabling me to construct a much fuller description of this species, which was known hitherto only from a poor Nyasaland (*Buchanan*) specimen. Clarke, in the Flora of Tropical Africa erroneously made it a synonym of *S. remota* Ridley.—*S. glabra* Boeck. Found in other places in Tropical Africa.

* Continued from K.B. 1956: 533 (1957).

Ascomycetes collected by Dr. R. Singer in Bolivia and North Argentina

R. W. G. Dennis

PEZIZALES

Ascobolaceae

Ascobolus foliicola *Berk. & Br.* in J. Linn. Soc. Bot. **14,** 109 (1873).

On palm, Rio Yariza, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1400–1500 m. *R. Singer* B1365, 23.2.1956.

Humariaceae

Lamprospora crec'hqueraultii (*Crouan*) *Boudier*, Hist. Class. Discom. d'Europe 69 (1907).

"Yellow", on bare earth, Coroico, Prov. Nor-Yungas, Dpto. La Paz, Bolivia. *R. Singer* B1262, 18.2.1956.

Cheilymenia ascoboloides (*Bert.*) *Boud.* in Trans. Brit. mycol. Soc. **4,** 367 (1914).

On cow manure in forest at 1100 m., Ciudad Universitaria, Sierra de San Javier, Prov. Tucuman, Argentina, *R. Singer* T3083, 26.5.1957.

Cheilymenia coprinaria (*Cooke*) *Boud.* Hist. Class. Discom. d'Europe 63 (1907).

A few apothecia mixed with the preceding.

Phaedropezia epispartia (*Berk. & Br.*) *Le Gal*, Discom. de Madagascar 181 (1954).

On dead fallen leaves, Rio Llolosa, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1550 m., *R. Singer* B789, 31.1.1956.

Phaedropezia flavida (*Berk. & Curt.*) *Le Gal*, Discom. de Madagascar 185 (1954).

On twig, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1623; "yellow, 8 mm. broad, on rotting debris in rain forest, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B2048, 16.3.1956.

Scutellinia spp.

Singer B767, 796, 1107, 1195, 2055, 2130, 2341 and 7832 are referrable to this genus, in which specific distinctions are highly critical. Their further study is deferred until Madame Le Gal has completed her detailed investigation of the group.

Sarcoscyphaceae

Cookeina colensoi (*Berk.*) *Seaver* in Mycologia **5,** 191 (1913) excluding description.

Ad lignum emortuum dicotyledoneum in silva inter campos prope rivam, Loreto, Dpto. Candelaria, Prov. Misiones, Argentina, *R. Singer* M1182, 23.4.1957.

Cookeina sulcipes (*Berk.*) *Kuntze*, Rev. Gen. Plant. **2,** 849 (1891).

On wood, Guayaramerin, Prov. Vaca Diez, Bolivia, 5–12.3.1956, *R. Singer* B1578 pars, 1599, 1607, 1703 (brown form), 1890 and 1891.

Cookeina tricholoma (*Mont.*) *Kuntze*, Rev. Gen. Plant. **2,** 849 (1891).

On dead wood, Rio Yariza, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, *R. Singer* B1370, 23.2.1956, 1400–1450 m.; on dead twig, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, B1578 pars, 5.3.1956; B1601, 6.3.1956; on dead fallen dicot. branch in subtropical forest, Puerto Iguazu, Misiones, Argentina, *R. Singer* M927 and 930, 12.4.1957.

Cookeina venezuelae (*Berk. & Curt.*) *Le Gal*, Discom. de Madagascar 241 (1954).

On wood, Rio Yariza, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1400–1500 m., *R. Singer* B1398, 23.2.1956.

Phillipsia dochmia (*Berk. & Curt.*) *Seaver*, N. Amer. Cup Fungi 184 (1928).

On rotten wood, Charobamba, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1350 m., *R. Singer* B1125, 13.2.1956; ? B711, 30.1.1956; on wood of a dicot. tree, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1615, 6.3.1956.

Phillipsia domingensis (*Berk.*) *Berk.* in J. Linn. Soc. Bot. **18,** 388 (1881).

Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1624, 6.3.1956; Santa Teresa, Prov. Madre de Dios, Dpto. Pando, Bolivia, *R. Singer* B2288, 28.3.1956.

HELOTIALES

Geoglossaceae

Trichoglossum hirsutum (*Pers. ex Fr.*) *Boud.*, Hist. Class. Discom. d'Europe, 86 (1907).

On palm in tropical forest, Rio Suapi, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1250–1300 m., *R. Singer* B1023, 9.2.1956; on decayed wood, Carmen Pampa, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 2000 m., *R. Singer* B1237, 17.2.1956.

Sclerotiniaceae

Rutstroemia bertholletiae *Dennis*, spec. nov.

Apothecia solitaria, stipitata, lutea, cupula concava, 5 mm. lata, glabra ; ascis clavatis, octosporis, 125 × 15μ, ascorum obturaculo iodi ope coerulescente, paraphysibus filiformibus 3μ crassis obvallatis ; ascosporis monostichis vel subdistichis, reniformis, hyalinis, 13–17 × 5–6μ, continuis dein biseptatis.

On leaf mould mixed with bark of *Bertholletia*, Las Piedras, Prov. Madre de Dios, Dpto. Pando, Bolivia, *R. Singer* B2532a (Typus) 5.4.1956.

Singer B2532a bears a marked resemblance to *Rutstroemia petiolorum* (Roberge) White, from which it apparently differs in colour and in lacking a crenate-fimbriate margin. Most species of *Rutstroemia* are rather narrowly host-limited and it seems unlikely a fungus associated with *Bertholletia* (Myrtaceae) in Bolivia can, in fact, be closely allied with one found on leaves of Fagaceae and Betulaceae in Europe and North America. It is to be hoped that further collections will be made, from which it can be seen with what plant organ the apothecia are associated. Secondary spores were not observed in the asci examined.

Helotiaceae

Encoelia heteromera (*Mont.*) *Nannfeldt* in Trans. Brit. mycol. Soc. **23,** 239 (1939).

On dead dicot. trunk in subtropical forest, Puerto Iguazu, Misiones, Argentina, *R. Singer* M962, 13.4.1957.

SPHAERIALES

Xylariaceae

Camillea labellum *Mont.* in Ann. Sci. Nat. Bot. Ser. 4, **3**, 113 (1855).

On bark, Riberalta, Prov. Vaca Diez, Dpto. Beni, Bolivia, 170 m., *R. Singer* B2416, 1.4.1956.

Daldinia eschscholzii (*Ehrenb. ex Fr.*) *Rehm* in Ann. mycol. **2,** 175 (1904).

Ivon, Prov Vaca Diez, Dpto. Beni, Bolivia, 190 m., *R. Singer* B2458, 3.4.1956; on dicot. trunk, Riberalta, Prov. Vaca Diez, Dpto. Beni, Bolivia, 170 m., *R. Singer* B2426, 2.4.1956; on dead dicot. trunk in rain forest, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1586, 5.3.1956; B1736, 8.3.1956; B1921, 12.3.1956.

Hypoxylon anthracoderma *Speg.* in An. Soc. Cient. Argentina **26,** 30 (1888).

On wood, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1580, 8.3.1956.

Kretzschmaria coenopus (*Fr.*) *Sacc.*, Syll. Fung. 2 p. xxix, 1883.

On bark, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1757, 8.3.1956.

Phylacia sagraeana (*Mont.*) *Mont.*, Syll. Gen. Spec. Crypt. 259 (1856).

On bark of dead dicot. log, Rio Yariza, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1400–1450 m., *R. Singer* B1400, 23.2.1956.

Poronia oedipus (*Mont.*) *Mont.* in Ann. Sci. Nat. Bot. Ser. 4, **3,** 114 (1855).

On dung, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B2113, 17.3.1956.

Poronia punctata (*F.*) *Fr.*, Summa Veg. Scand. Sect. Post. 382 (1849).

Ad fimum, Infiernillo, Prov. de Tucuman, Argentina, 3000 m., *R. Singer* T2262.

Xylosphaera aemulans (*Starbäck*) *Dennis*, comb. nov.

Xylaria aemulans Starbäck in Bih. t. Svensk Vet. Akad. Handl. Bd. 27, Afd. 3, No. 9, 13 (1901).

On bark, Sta. Rosa, inundated zone of Rio Madre de Dios, Prov. Manuripe, Dpto. Pando, Bolivia, *R. Singer & E. R. de la Sota* B2143, 22.3.1956.

Xylosphaera aenea (*Mont.*) *Dennis* in Kew Bull. 1958.

On dead wood, Carmen Pampa, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 2000 m., *R. Singer* B1565, 26.2.1956.

Xylosphaera anisopleura (*Mont.*) *Dennis* in Kew Bull. 1958.

On dead trunk in coffee plantation, Coroico, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1500–1900 m., *R. Singer* 998, 8.2.1956.

Xylosphaera comosa (*Mont.*) *Dennis* in Kew Bull. 1958.

On dicot. branch fallen from tree in rain forest, Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1869, 12.3.1956; Ivon, Prov. Vaca Diez, Dpto. Beni, Bolivia, 190 m., *R. Singer* B2455, 3.4.1956.

Xylosphaera cubensis (*Mont.*) *Dennis* in Kew Bull. 1958.

Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B2110, 17.3.1956.

Xylosphaera curta (*Fr.*) *Dennis* in Kew Bull. 1958.

On dicot. wood in subtropical forest, Puerto Iguazu, Misiones, Argentina, *R. Singer* M942 pars, M944, 12.4.1957.

These are the white-scaled state often called "*Xylaria rhopaloides* Starb."

Xylosphaera grammica (*Mont.*) *Dennis* in Kew Bull. 1958.

Ivon, Prov. Vaca Diez, Dpto. Beni, Bolivia, 190 m., *R. Singer* B2466, 3.4.1956; ad lignum dicotyledonum, Dique de Escaba, Prov. Tucuman, Argentina, *R. Singer*, T2810, 4.6.1956; on dicot. wood in subtropical forest, Puerto Iguazu, Misiones, Argentina, *R. Singer* M942, 12.4.1957, immature.

Xylosphaera guyanensis (*Mont.*) *Dennis* in Kew Bull. 1958.

Chijchipi, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, *R. Singer* B1252, 16.2.1956, immature.

Xylosphaera multiplex (*Kunze*) *Dennis* in Kew Bull. 1958.

On dead dicot. wood, Rio Yariza, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, 1400–1450 m., *R. Singer* 1402, 23.2.1956, immature; on dicot. wood, Coroico, Prov. Nor-Yungas, Dpto. La Paz, Bolivia ± 1650 m., *R. Singer* B1258, 18.2.1956.

Xylosphaera polymorpha (*Pers. ex Saint Amans*) *Dumortier*, Comm. Bot. 92 (1822).

Chijchipi, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, *R. Singer* B1252, 16.2.1956; on dicot. wood, Rio Yariza, Prov. Nor-Yungas, Dpto. La Paz, Bolivia, *R. Singer* B1357, 23.2.1956; Guayaramerin, Prov. Vaca Diez, Dpto. Beni, Bolivia, *R. Singer* B1907, 12.3.1956; B2109, March 1956 (State called "*Xylaria schweinitzii* B. & C."); on dead wood in subtropical forest, Puerto Iguazu, Misiones, Argentina, *R. Singer* M934, 12.4.1957 (State called "*Xylaria obovata* (Berk.) Fr.").

Xylosphaera scruposa (*Fr. emend Mont.*) *Dennis* in Kew Bull. 1958.

On dicot. tree in subtropical forest, Refugio El Yaguareti, Dpto. Iguazu, Prov. Misiones, Argentina, *R. Singer* M1075, 17.4.1957; Puerto Iguazu, Misiones, Argentina, *R. Singer* M942 pars, 12.4.1957.

Xylosphaera telfairii (*Berk.*) *Dennis* in Kew Bull. 1958.

On dicot. tree stump, Las Piedras, Prov. Madre de Dios, Dpto. Pando, Bolivia, *R. Singer* B2539, 5.4.1956; on fallen dicot. trunk in subtropical forest, Puerto Iguazu, Prov. Misiones, Argentina, *R. Singer* M920, 11.4.1957; on dicot. wood in subtropical-montane forest, Las Lenguas, Prov. Tucuman, Argentina, 1350 m., *R. Singer* T3029, 27.2.1957.

Descriptions and figures of most of the species listed above will be found in the papers cited below.

Le Gal, M. 1954. Prodrome à une Flore Mycologique de Madagascar. IV. Les Discomycètes de Madagascar.

Dennis, R. W. G. 1957a. Some Xylarias of Tropical America. Kew Bulletin 1956, 401–444.

Dennis, R. W. G. 1957b. Further Notes on Tropical American Xylariaceae. Kew Bulletin 1957, 298–332.

Country Life Annual.*—The Country Life Annual for 1958 contains 42 articles covering a wide range accompanied by excellent illustrations. Among the interesting articles here published may be mentioned "What is a native British tree" by Maynard Greville, "Water in British gardens" by A. G. L. Hellyer, "Some Royal trees" by R. C. B. Gardner, and "An English garden in Italy" by Oliver Warner. The Annual is well-produced and nicely printed.

H. S. MARSHALL.

*Country Life Annual, 1958. Pp. xxiv + 188. London: Country Life Ltd. Price 10/-.

Contributions to the Flora of Tropical America: LXIII*

Plantae Hintonianae: XII†

P. G. Wilson

The identification of the collection made by the late G. B. Hinton in Southern Mexico was discontinued in 1939 at the outbreak of the War, when a considerable proportion of the very large Kew set was still unnamed. Study of this collection was resumed in 1955, with the aim of incorporating the entire Kew set in the Herbarium without further delay. A number of outstanding new species have been detected and are described in this paper, while notes are included on some little-known plants which have been reconsidered and can now be better interpreted with Mr. Hinton's ample material.

The Kew (first) set, which came to an end at the outbreak of the War before Mr. Hinton's death in March, 1943, contains some 14,500 numbers. After his death the collecting was continued by one of his sons and eventually reached a total of about 17,000 numbers. There are several sets of Hinton's plants in the great American herbaria, where many new species have been described from this excellent collection.

CAPPARIDACEAE

Forchhammeria hintonii *P. G. Wilson* sp. nov.; *F. brevipedi* Urb. affinis sed floribus masculis sessilibus vel subsessilibus fructu breviter stipitato vel subsessili differt.

Arbor vel arbuscula 1–6 m. alta, glabra. *Caules* juveniles caesii, minute lenticellati; internodia 1–3 cm. longa. *Folia* alterna vel subopposita; petiolus crassus, supra leviter sulcatus, c. 6 mm. longus; lamina coriacea, integra, elliptica, obovata vel oblanceolata, apice acuto vel rotundato vel emarginato, basi cuneata vel obtusa, ad 15 cm. longa et 4·5 cm. lata, nervo medio supra applanato subtus prominente, nervis lateralibus numerosis subtus tenuiter prominentibus marginem versus anastomosantibus. *Inflorescentiae* unisexuales, ex axillis foliorum ortae, racemosae vel sparse paniculatae, 4–13 cm. longae. *Flores masculi* sessiles vel subsessiles, fasciculati; sepala c. 6, inaequalia, lineari-lanceolata, c. 0·5 mm. longa; petala nulla; discus c. 1·2 mm. latus; stamina c. 12 vel ultra, super disco inserta, filamentis filiformibus 1·2–1·8 mm. longis, antheris subglobosis c. 1 mm. longis. *Flores feminei* sessiles vel breviter pedicellati; sepala triangulata, inaequalia, c. 1 mm. longa; petala nulla; stamina c. 12, sterilia, antheris quadratis, apiculatis, c. 1 mm. longis, sessilibus; disco insertis; ovarium juvenile ignotum. *Fructus* levis, flavus, subglobosus, breviter stipitatus, carpello abortivo vix evoluto semi-globoso supra basin prominente, c. 10 mm. diametro, 9 mm. altus; stigma bilobatum, sessile, prope basin fructus positum.

*Continued from Kew Bull. 1956, 296.
†Continued from Kew Bull. 1939, 199.

Mexico. State of Mexico: District of Temascaltepec; Acatitlan, 'shrub 2 m.', 29 March 1935 (fr.), *G. B. Hinton* 7571 (type); *ibid.*, 'tree 6 m.', 20 Febr. 1935 (♂ fl.), *Hinton* 7401; Platanal, '1 m. high', 8 March 1934 (fr.), *Hinton* 5746.

This species of *Forchhammeria* falls into Standley's subgenus *Helandra*, which is characterized by the excentricity of its fruit. Its nearest affinity appears to be with the two Hispaniolan plants (probably conspecific), *F. brevipes* Urb. and *Murbeckia haitiensis* Urb. et Ekm. (the latter was described from fruiting material only). From the former it differs in having sessile or nearly sessile male flowers, and from both in the fruit being only shortly stipitate or subsessile.

BURSERACEAE

Bursera crenata *P. G. Wilson* sp. nov.; a *B. trimera* Bullock foliis omnibus simplicibus basi semper cuneatis, pedicello fructifero multo longiore cernuo differt.

Arbor 5–6 m. alta, glabra; truncus cortice papyraceo rubro vel rubro-griseo. *Folia* simplicia, apice ramulorum annotinorum abbreviatorum congesta vel secus ramulos hornotinos longos alterna, elliptico-oblonga vel oblanceolata, apice obtusa vel rotundata, brevissime apiculata, basi cuneata atque saepe longe attenuata, saepius 4–7 cm. longa et 1·5–2·2 cm. lata, conspicue regulariter crenata crenis margine cartilagineis, nervis primariis utroque costae latere 15–18 ascendentibus parallelis supra fere planis subtus prominentibus; petiolus 5–8 mm. longus. *Inflorescentia feminea* tantum visa, ex axillis foliorum apice ramulorum orta, brevissima, ut videtur ad 3-flora, demum fructifera ad 12 mm. longa. *Flores* feminei trimeri; sepala ovato-lanceolata, acuta, 2 mm. longa; petala ascendentia, lanceolato-oblonga, apice obtuso, marginibus incurvis; staminodia 6, filamentis filiformibus 1·2 mm. longis, antheris abortivis c. 0·7 mm. longis; discus annularis, carnosus; pistillum totum 1·8 mm. longum; ovarium ovoideum, glabrum, stylo tenui fere aequilongo, stigmate capitato triradiato. *Drupae* 1–3, pendulae, 6 mm. longae et 4 mm. latae, trigonae et trivalves, ambitu oblique ovoideae, apice obtuso; pedicelli ad 7 mm. longi, cernui; semina trigona, arillo pallide flavo omnino induta.

Mexico. State of Michoacan: District of Apatzingan; Apatzingan, 300 m., 'tree 5 m', 13 Aug. 1938 (fr.), *G. B. Hinton* 12011; *ibid.*, 350 m., 15 Aug. 1938 (fr.), *Hinton* 12025 (type); *ibid.*, 340 m., 'tree 5 m.', 20 Aug. 1938 (fr.), *Hinton* 12063; *ibid.*, 340 m. 'tree 5 m.', 6 Jan. 1939 (fr.), *Hinton* 12831; Tepalcatepec, 350 m., 'tree 5 m.', 25 Aug. 1938 (fr.), *Hinton* 12102; *ibid.*, 'tree 6 m.', 5 Jan. 1939 (fr.), *Hinton* 12829; Buena Vista, 400 m., 'tree 6 m.', 22 Aug. 1938 (fl. & fr.), *Hinton* 12071.

This plant resembles *B. trimera* Bullock, with which it grows at Tepalcatepec, but the leaves are all simple and more cuneate at the base, and the fruit is conspicuously pedicellate and nodding, not subsessile.

Bursera sarcopoda *P. G. Wilson* sp. nov.; a *B. hintonii* Bullock rachi haud alata, pedicello fructifero supra medium incrassato carnoso, seminibus arillo haud omnino sed dimidio inferiore indutis differt.

Arbor, 5–8 m. alta; truncus cortice papyraceo rubro-brunneo. *Folia* alterna, pinnata, petiolo ad 13 cm. longo incluso ad 60 cm. longa, 7–9-

foliolata; petiolus, rachis nuda omnino exalata, necnon petioluli breves pilis crispulis dense pubescentes; foliola ovata vel elliptica vel foliolum terminale obovatum, apice conspicue argute acuminata, basi rotundata vel obtusa vel in foliolo terminali acute cuneata, ad 16 cm. longa, 5–11 cm. lata, conspicue regulariter serrato-crenata, utrinque dense molliter pubescentia, nervis primariis utroque latere costae 10–14 ascendentibus; petioluli laterales inferiores 5–8 mm. longi. *Thyrsi* ex apice ramuli conferti, pubescentes, ut videtur unisexuales, ad 32 cm. longi; bracteae basales lanceolatae, pubescentes, ad 1 cm. longae. *Flores masculi* tetrameri, pedicellis gracilibus ad 4 mm. longis; sepala ovata, obtusa, 1 mm. longa, extra pubescentia, ciliata; petala oblonga, obtusa, 2·5 mm. longa, extra secus medium pubescentia; stamina 8, filamentis subulatis 1 mm. longis, antheris oblongis 1 mm. longis; discus annularis, carnosus; ovarium parvum abortivum. *Flores feminei* masculis similes sed antheris abortivis c. 0·5 mm. longis, ovario ovoideo glabro, stylo conico, stigmate capitato. *Drupae* planae, ellipticae, apiculatae, ad 11 mm. longae et 7 mm. latae, valvis 2; pedicelli fructiferi ad 12 mm. longi, superne sub fructu per 4–5 mm. incrassati carnosi atque resinosi. *Semina* subovoidea, compressa, 7 mm. longa, 5–6 mm. lata, testa siccitate brunnea vel saepe nigrescente, dimidio inferiore necnon secus margines usque ad duos trientes longitudinis arillo aurantiaco induta.

Mexico. State of Michoacan: District of Coalcoman; Aquila, 220 m., 'tree with a tall straight trunk 5 m. high', 18 Nov. 1938 (fl.), *G. B. Hinton* 12608; *ibid.*, 240 m., 'tree 6 m., bark very fragrant', 18 Nov. 1938 (fr.), *Hinton* 12609; Trojes, 500 m., 'tree 8 m.', 30 Sept. 1938 (fl. & fr.), *Hinton* 12293 (type).

Vernacular name: Tecomaca.

This plant is interesting in having large leaves with a wingless rhachis, long inflorescences, and in the upper part of the fruiting pedicel being fleshy.

PAPILIONACEAE

Dalea argyrotricha *P. G. Wilson* sp. nov.; *D. lagopinae* (Rydb.) Gentry ut videtur affinis sed caulibus foliisque pilosis, foliolis obtusis multo longioribus differt.

Herba annua, caule erecto molliter piloso ad 40 cm. longo; internodia saepius 1·4 cm. longa. *Stipulae* nigrae, lineari-lanceolatae, pilosae, parte inferiore petiolo adnata, 7 mm. longae. *Folia* ad 4 cm. longa; rhachis sericea, internodiis 4–5 mm. longis; foliola sessilia, anguste elliptica, obtusa, 8–13 mm. longa, 2·5–4 mm. lata, glanduloso-punctata, supra sparse pilosa vel adulta glabra, subtus satis sparse subadpresse pilosa. *Inflorescentia* terminalis, pedunculo piloso, 4–12 cm. longo, racemo cylindrato ad 6 cm. longo, 8 mm. lato, pilis statu vivo argenteis dense lanato-villoso; bracteae nigrae, anguste lanceolatae, acuminatae, 4 mm. longae, pilosae, glandulis subrutilis praeditae, marginibus scariosis. *Flores* sessiles; calycis tubus sericeo-pilosus, costis nigris, 2 mm. longus, minute glandulosus, lobis subulatis 2 mm. longis. *Petala* rubro-purpurea; lamina vexilli basi breviter cordata, 1·8 mm. longa, 1·9 mm. lata, ungue 2 mm. longo; alae tubo staminali infra medium affixae, lamina oblonga, 1·8 mm. longa, 0·8 mm. lata, ungue 1·2 mm. longo; carinae petala leviter conjugata, tubo staminali affixa, laminis obovatis basi

breviter lobulatis, 2·7 longis, 1·8 mm. latis, unguibus 2 mm. longis. *Stamina* 10, tubo filamentisque liberis inclusis usque ad 4·5 mm. longa. *Ovarium* ellipsoideum, dimidio superiore pilosum, inferiore glabrum, 1 mm. longum; stylus 4 mm. longus; ovula 2.

Mexico. Federal District: Camino de Toluca, 8000 ft., 'sunny banks', Oct. 1938, *E. K. Balls & W. B. Gourlay* B. 5566 (type).

State of Mexico: Amecameca, 8300–8500 ft., 13 Oct. 1908, *C. R. Barnes & W. J. G. Land* 364a; Vallée de Mexico, San Nicolas, 1865-1866, *M. Bourgeau* 938.

Mexico, 1830, *G. J. Graham* 182; Mexico, 1834, *Keerl* (?).

Due to its sessile flowers and exserted staminal tube this plant belongs to the '*Euparosela*' of Rydberg, N. Am. Fl. **24** pt. 1, in the section *Lagopodes*. It differs from *D. lagopina* (Rydb.) Gentry in having much longer leaflets, which are pilose, not glabrous, and much smaller flowers. From the other species in this section it is distinguished by its pilose, not glabrate, calyx tubes.

Dalea cuniculo-caudata *P. G. Wilson* sp. nov.; Sectionis *Microphyllarum*, *D. zimapanicae* S. Schauer affinis sed floribus caeruleis vel purpureis, bracteis pilosis lineari-lanceolatis acuminatis differt.

Suffrutex erectus, 1·5 m. altus, radicibus longis gracilibus; caulis glaber, pallidus, longus, gracilis, ramis multis ascendentibus parallelis gracilibus glabris. *Stipulae* minutae, triangulari-acuminatae, 1 mm. longae. *Folia* glabra, ad 2·5 cm. longa; petiolus 2 mm. longus, eglandulosus; internodia rhacheos anguste alata, alis glaucis, glandulosis; foliola (11–) 19–25, petiolulis 0·5 mm. longis, laminis oblanceolatis vel oblongis, apice oblongo vel rotundato, basi obtusa vel cuneata, ad 4 mm. longis, 1 mm. latis, subcarnosis cymbiformibus, subtus glaucis glandulosis, costa haud manifesta. *Inflorescentiae* terminales, pedunculis 2–4·5 cm. longis; racemi congesti subglobosi vel oblongi, ad 2·5 cm. longi, 1·5–2 cm. lati; bracteae nigrae, lineari-lanceolatae, acuminatae, 4·8 mm. longae, 0·9 mm. latae, pilosae, glandulosae. *Calycis* tubus 2·2 mm. longus, extra dense pilosus, lobis subulatis pilosis 2–3 mm. longis. *Flores* haud magni; vexillum album, lamina basi late cordata, obtusa, 3 mm. longa et lata, ungue 2·5 mm. longo; alae caeruleae vel purpureae, lamina oblonga, 4 mm. longa, 1·6 mm. lata, ungue 1·1 mm. longo lateri vaginae staminalis affixo; carinae petala margine inferiore sibi adnata, caerulea vel purpurea, glandula terminali praedita, lamina 4 mm. longa, 1·3 mm. lata, ungue 2 mm. longo vaginae staminali prope marginem inferiorem affixo. *Stamina* 10, in vaginam superne fissam connata; vagina filamentis liberis inclusis usque ad 7 mm. longa. *Ovarium* ellipsoideum, dimidio superiore pilosum, inferiore glabrum, 1·2 mm. longum, 0·5 mm. latum; stylus dimidio inferiore pilosus, superiore glaber, 5·5–6 mm. longus; ovula 2.

Mexico. State of Mexico: District of Temascaltepec; Mina de Agua, 1990 m., "pine woods", 31 Oct. 1932, *G. B. Hinton* 2333 (type); Chorrera, 1230 m., 13 Oct. 1932, *Hinton* 2168; Tejupilco, 1340 m., 3 Sept. 1932, *Hinton* 1590.

State of Michoacan: District of Zitacuaro; Zitacuaro to Guanoro, 1900 m., 'sparse oak forest on hillside', 13 Nov. 1938, *Hinton* 13462.

Vernacular name: Escobilla.

Petalostemon tripetalus *P. G. Wilson* sp. nov.; *P. obreniformi* Rydb. affinis sed calyce glabro, bracteae margine lata hyalina, petalis anterioribus tantum 2, differt.

Herba annua, erecta, caule ramoso, purpureo, sparse glanduloso, glabro vel ad apicem piloso, ad 20 cm. alto. *Stipulae* triangulari-acuminatae, inferne glandulosae, 1 mm. longae. *Folia* glabra, ad 3 cm. longa, petiolo anguste alato, internodiis 2–3 mm. longis; stipellae in latere superiore rachidis dispositae, subulatae, c. 0·3 mm. longae; foliola 9–19, petiolulis 0·5 mm. longis basi glandulis inferne praeditis, laminis oblongis 5–8 mm. longis, 2 mm. latis, basi cuneata vel obtusa, apice rotundato vel truncato nonnunquam levissime emarginato, inferne minute glandulosis. *Inflorescentiae* terminales, pedunculis 8–16 mm. longis; racemi congesti ovati vel late oblongi, 1·5–2 cm. longi, 8–10 mm. lati. *Bracteae* obovatae, apiculatae, glabrae, sparse et breviter ciliatae, margine lata hyalina, centro nigro glanduloso, 2–3 mm. longae, 1·2 mm. latae. *Calyx* glaber, glandulosus, tubo 2 mm. longo, superne profunde fisso, lobis triangularibus acuminatis dense pilosis 0·5 mm. longis. *Petala* caerulea; vexillum lamina suborbiculari, obtusa, 2·5 mm. longa, ungue 1·5 mm. longo; petala anteriora 2, libera, lamina oblonga ad 1·8 mm. longa, 1 mm. lata, breviter unguiculata, prope apicem vaginae staminalis exorientia. *Stamina* 5, in vaginam supra fissam coalita; vagina filamentis liberis inclusis usque ad 3·8 mm. longa. *Ovarium* late ellipsoideum, 0·5 mm. longum, quarta parte superiore pilosum, ceterum glabrum; stylus glaber, 3·5 mm. longus; ovula 2.

Mexico. State of Michoacan; District of Zitacuaro, Zitacuaro to Los Macheros, 2550 m., 'stony hillside', 11 Oct. 1938, *G. B. Hinton* 13351 (type).

This plant is interesting as it has only 5 stamens and 2 anterior petals. It is thus intermediate in character between *Petalostemon*, which normally has 5 stamens and 4 anterior petals, and *Dalea* section *Urceolatae*, which has 7–8 stamens and 2 anterior petals. As the petals in this species are inserted near the apex of the staminal tube I think it is better placed in the former genus.

It has been suggested by Gleason in New Britton and Brown Illust. Fl. **2:** 410 (1952) that the anterior petals in *Petalostemon* are modified staminodes since they alternate with the stamens. If this is so, then in those species belonging to the section *Urceolatae* of *Dalea* the anterior petals are of a similar nature.

CAESALPINIACEAE

Cassia (**Peiranisia**) **multifoliolata** *P. G. Wilson* sp. nov.; *C. botterianae* Benth. affinis sed foliis multo longioribus floribus multo majoribus differt.

Arbor ad 8 m. alta, ramulis pilosis. *Stipulae* lineari-lanceolatae vel lanceolatae, acuminatae, parce pubescentes, 1·3–2·3 cm. longae, 0·2–0·6 cm. latae. *Folia* paripinnata, 7–13-juga, ad 25 cm. longa, petiolo piloso 5–7 cm. longo, rhachidis internodiis parce sericeis, 0·7–1·4 cm. longis, glandulis singulis inter juga inferiora foliolorum clavatis vel elongato-subulatis ad 4 mm. longis, inter juga superiora minutis vel nullis; petioluli 1–2 mm. longi; foliola oblonga vel ovata vel obovata, apice rotundato minute apiculato, basi cuneata vel rotundata, 2–3 cm. longa, 0·8–1·7 cm. lata, membranacea vel chartacea, adulta supra glabra, infra praecipue secus costam pubescentia, marginibus prorsus ciliatus. *Racemi* ex axillis foliorum orti, ad 16 cm. longi,

inferne nudi apice congestiflori, pedunculo 5–6 cm. longo piloso; bracteae caducae, anguste lanceolatae, acuminatae, 0·8–1 cm. longae; pedicelli c. 2 cm. longi, pilosi, basi glandulis minutis clavatis circumdati. *Flores* magni, speciosi, 4–6 cm. lati. *Sepala* 5, ciliata, 2 exteriora sparse pilosa, 3 interiora glabra, ovata vel suborbicularia, 1·1–1·6 cm. longa, 0·6–1 cm. lata. *Petala* glabra, flava; 3 supera unguibus brevibus 4 mm. longis, laminis subquadratis ad 2·8 cm. longis apice late retusis; infera anguste elliptica, 3 cm. longa. *Stamina* 3 infera filamentis ad 2 cm. longis, antheris curvis 1·1 cm. longis; 4 supera filamentis 5 mm. longis, antheris 8 mm. longis; staminodia 3, filamentis 5 mm. longis, laminis 5·5 mm. longis. *Pistillum* gracile, sparse sericeum, ad 3 cm. longum. *Legumen* 12–16 cm. longum, 1 cm. latum, apice longe apiculato, stipite c. 2 mm. longo; valvae chartaceae, glabrae, inter semina transversa depressae.

Mexico. State of Michoacan: District of Coalcoman; Sierra Torrecillas, 2360 m., 'forest, slender tree 8 m.', 12 Oct. 1938 (fl.), *G. B. Hinton* 12352 (type); Paracho, 2350 m., hills, 'shrub 4 m.', 1 Dec., 1936 (fl.), *Hinton* 9945; Armenia, 2400 m., 'shrub 5 m.', 10 May, 1937 (fr.), *Hinton* 10177.

This species is distinctive with its large flowers, multifoliolate leaves, and narrow chartaceous pods. It resembles *C. andrieuxii* Benth., which has been placed by Britton and Rose in the genus *Gaumerocassia*, and apparently only differs from this latter genus by having glands on the leaves.

MELASTOMACEAE

Tibouchina latibracteolata *P. G. Wilson* sp. nov.; *T. monticolae* (Naud.) Cogn. affinis sed foliis subsessilibus, bracteolis latioribus differt.

Suffrutex erectus, ad 1 m. altus. *Rami* graciles, dense breviter hirsuti, pilis simplicibus vel in statu juvenili minute glandulosis; internodia ad 3 cm. longa. *Folia* rigide chartacea; petiolus ad 4 mm. longus, dense pilosus; lamina ovata, apice acuminato, basi obtusa vel rotundata, ad 3 cm. longa, 1·4 cm. lata, e basi 3- vel 5-nervata, utrinque dense velutino-pilosa, pilis folio breviter tantum adnatis vel liberis. *Flores* in axillis foliorum breviter pedicellati; pedicellus 2–6 mm. longus, dense et breviter pilosus; bracteolae sessiles, sub apice pedicelli positae, late ovatae vel suborbiculatae, apice acuto, basi rotundata, ad 9 mm. longae, 7 mm. latae, indumento foliorum praeditae. *Hypanthium* urceolatum, dense hirsutum, pilis simplicibus vel minute glandulosis, 7–9 mm. longum, c. 5 mm. latum. *Sepala* 5, linearia, acuta, c. 6 mm. longa, 1 mm. lata, intus sursum hirsuta aliter glabra, extra hirsuta. *Petala* 5, siccitate purpurea, ciliata, obovoidea, apice rotundato, basi cuneata, c. 17 mm. longa, 12 mm. lata. *Stamina* 10, filamentis 2 serierum gracilibus, glabris, 8 mm. et 10·5 mm. longis, antheris seriei sepalis oppositae c. 9 mm. longis connectivo infra loculos c. 1 mm. longo basi antice breviter bituberculato, seriei petalis oppositae c. 7 mm. longis connectivo infra loculos subnullo basi antice breviter bituberculato. *Stylus* glaber, c. 15 mm. longus. *Capsula* urceolata, teres, ad 9 mm. longa, 6 mm. lata, sepalis tarde caducis. *Semina* numerosa, minuta, cochleata.

Mexico. State of Guerrero: District of Temascaltepec; Chorrera, 26 Dec. 1934, *G. B. Hinton* 7165 (type); *ibid.*, 1230 m., '1 m. high', 18 Nov. 1932, *Hinton* 2637; Tejupilco, 1440 m., 'from Cerro Rincón de Aguirres, grows 1 m. high, has a strong odour of coconut', 27 May 1932, *Hinton* 704; Rincon

del Carmen, 28 Dec. 1934, *Hinton* 7181; Cuentla, 'pine woods, 0·4 m. high', 5 Dec. 1935, *Hinton* 8695.

This species is peculiar for the genus *Tibouchina* as it has foliar hairs which are either entirely free or only slightly adnate at the base.

CUCURBITACEAE

Microsechium hintonii *P. G. Wilson* sp. nov.; a speciebus adhuc cognitis inflorescentia mascula multo longiore, nectariis calycis tubi plane evolutis differt.

Herba scandens, monoica; caules parce pubescentes vel glabri; cirrhi 3 4-fidi. *Folia* profunde ultra medium 3–5-lobata, sinu basilari lato, marginibus remote minuteque denticulatis, supra leviter pubescentia, subtus venis venulisque tantum pubescentibus, lamina tota 17 cm. longa et 23 cm. lata; petioli 2–3 cm. longi. *Inflorescentiae masculae* anguste paniculatae, paniculis ad 27 cm. longis, floribus in ramulis abbreviatis congestis; receptaculum pateriforme, 10-radiatum et 10-foveolatum; sepala glabra, minuta, linearia, 1 mm. longa; corolla rotata, 5-lobata, lobis ovatis, obtusis, 3 mm. longis, parce ciliatis; stamina filamentis usque ad medium in columnam coalitis, supra medium radiatim divaricatis, antheris 4–5, 2-locularibus, loculis flexuosis. *Inflorescentiae femineae* in eadem axilla cum inflorescentiis masculis ortae, floribus geminatis subsessilibus apice pedunculi c. 5 mm. longi; flores feminei masculis similes sed corollae lobi 3–5; ovarium ovoideum, aculeatum, stylo 2 mm. longo, stigmate peltato 5-lobato, staminodiis nullis. *Fructus* fere sessilis, ellipsoideus, 3 cm. longus, echinatus, aculeis retrorsis longitudinaliter 5-seriatis in quaque serie 5–6 ipsis scabris cum setulis densis retrorsis; pedunculus communis fructifer 3–5 cm. longus. *Semen* complanatum.

Mexico. State of Mexico: District of Temascaltepec; San Lucas, 24 Oct. 1935, *G. B. Hinton* 8596 (type); *ibid.*, 28 Nov. 1933, *Hinton* 5270; Vigas, 1080 m., 25 Sept. 1933, *Hinton* 4808.

Vernacular name: Chayotillo.

This plant resembles *Ahzolia composita* (Donn. Smith) Standl. et Steyerm. in the characters of the male flowers, i.e. 5 perianth segments, the glandular nature of the receptacle, and the anthers being on partially free filaments. That species has, however, a fleshy fruit which when dry is 10-cristate. The fruit of *M. hintonii* has 5 rows of spines and the pericarp when dry is hard and almost woody. The two species are obviously closely related but, in the present state of our knowledge of this section of the *Cucurbitaceae*, it appears to be better to place this new species in *Microsechium*. The only other member of this genus with which I am acquainted, *M. helleri* (Peyr.) Cogn., has 4-merous male flowers with receptacular glands either closed or absent. It has, however, similar stamen characters and aculeate fruit. *M. palmatum* (Ser.) Cogn. is peculiar in having leafy bracts at the base of the tendrils and is possibly not a member of this genus.

RUBIACEAE

Crusea grandiflora *P. G. Wilson* sp. nov.; a *C. rubra* (Jacq.) Cham. et Schlecht. corolla majore, tubo magis hypocrateriformi differt.

Herba annua, erecta, ad 2 m. alta; caulis subquadrangularis pilis basi tuberculatis aspere hispidulus, maculatus, internodiis 16–18 cm. longis. *Folii* lamina anguste ovata vel ovata vel elliptica, apice longe acuminato, basi cuneata vel acuminata, ad 12 cm. longa, 3·5 cm. lata, utrinque praecipue in nervis subtus hispida; petiolus anguste alatus, c. 1 cm. longus, hispidus. *Stipulae* vaginatae, limbo 3–5 mm. alto, setoso, setis c. 6 filiformibus, 5–10 mm. longis, ipsis parce hispidis. *Capitulorum* bracteae involucrales foliis similes, 1–6 cm. longae. *Flores* rubri, numerosi, subsessiles, bracteis linearibus setosis hispidis c. 0·5 mm. longis. *Calycis* tubus c. 0·6 mm. longus, supra ovarium paulum constrictus, lobis filiformibus setosis hispidis lobulis 1 vel 2 minutis interpositis. *Corollae* tubus anguste hypocrateriformis, minute puberulentus, 14–18 mm. longus, basi 1 mm. lata, apice 3 mm. lato; lobi oblongi, apice extra hirsuti, ad 7 mm. longi, c. 1·5 mm. lati. *Stamina* exserta, filamentis filiformibus ad 11 mm. longis, antheris c. 1·7 mm. longis. *Ovarium* breviter oblongum, planum; stylus c. 2·8 cm. longus, apice breviter bidentato. *Cocci* ovoideo-rotundi, glabri, 4 mm. longi, pericarpio minute albido-maculato.

Mexico. State of Mexico: District of Temascaltepec; Tenayac, 1540 m., 28 Sept. 1933, *G. B. Hinton* 4848 (type); *ibid.*, 17 Oct. 1935, *Hinton* 8365; Tejupilco, 1340 m., 7 June 1932, *Hinton* 716; *ibid.*, 24 Sept. 1935, *Hinton* 8489; Calera, 8 Oct. 1935, *Hinton* 8532; *ibid.*, 7 Nov. 1935, *Hinton* 8726; *ibid.*, 770 m., 8 Oct. 1932, *Hinton* 2024; Nanchititla, 16 Oct. 1935, *Hinton* 8565; Salitre, 19 Sept. 1935, *Hinton* 8466; Puerto Salitre, 1300 m., 21 Sept. 1932, *Hinton* 1799; Conitas Salitre, 25 May 1935, *Hinton* 7810.

Vernacular name: Cabezona.

This species is closely related to the very variable plant commonly referred to as *C. rubra* (Jacq.) Cham. et Schlecht. From the latter it is distinguished by its long and more hypocrateriform corolla tube and by its erect habit.

COMPOSITAE

Guardiola pappifera *P. G. Wilson* sp. nov.; a speciebus adhuc cognitis achaeniis radii pappo squamelloso praeditis differt.

Herba scandens vel semiprocumbens, ad 1 m. alta. *Caulis* glaber, tenuis, striatus, internodiis 5–10 cm. longis. *Folia* opposita; petiolus glaber, gracilis, ad 4·5 cm. longus; lamina ovato-lanceolata vel rhomboideo-ovata, apice acuminata, basi fere truncata vel late cuneata subhastata angulis argutis acutatis, 5–9 cm. longa, 2·5–5·5 cm. lata, tenuis, marginibus sparse minute serrulatis, basi superne parum pilosa, aliter glabra, basi quintuplinervia. *Pedunculi* ex axillis foliorum apice caulium orti, glabri, graciles, ad 5 cm. longi. *Capitulum* unicum; involucrum late obovoideum, bracteis 3, multistriatis ecarinatis, late oblongis, obtusis, 1·1 cm. longis, 7 mm. latis; receptaculum parvum, planum, paleis scariosis linearibus acutis, 1·1 cm. longis, 3 mm. latis. *Flosculi radii* c. 7, feminei, tubo corollae tenuissimo ad 6 mm. longo, lamina minuta, tridentata, ad 1 mm. longa; rami styli divaricati, leves, acuti, c. 1 mm. longi; antherae nullae; achaenia obconica, striata, puberulenta, ad 6 mm. longa, 1·8 mm. lata, callo basilari magno aequali (haud unilaterali) c. 0·8 mm. longo; squamellae pappi c. 6, quadratae vel late oblongae, c. 1·5 mm. longae, serratae, imbricatae. *Flosculi disci* ∞; tubus corollae tenuissimus ad 11·5 mm. longus; limbus profunde 5-lobatus, lobis

linearibus c. 2 mm. longis; antherae siccitate saturate nigro-virides, 1·2 mm. longae, basi rotundata, filamentis villosissimis c. 0·8 mm. longis; rami styli hirtelli, c. 1·3 mm. longi; achaenia sterilia, gracilia, c. 3 mm. longa; pappus et callus nullus.

Mexico. State of Guerrero: District of Mina; Paruncio, 320 m., "woods", 28 Sept. 1936, *G. B. Hinton* 9333 (type).

This plant is peculiar in having ray florets with a squamellate pappus, but otherwise it resembles the other species in *Guardiola*. Although this character could be used as a basis for forming a new genus, until a revision of the Mexican *Melampodinae* is undertaken it would be unwise to do so.

Zinnia jugistyla *P. G. Wilson* sp. nov.; a speciebus adhuc cognitis floribus disci sterilibus stylo fere indiviso apice bidentato tantum differt.

Herba annua, decumbens vel erecta, appresse pilosa, ramis compluribus e basi ortis. *Caules* graciles ad 15 cm. longi, internodiis 2 -2·5 cm. longis. *Folia* opposita, petiolo brevi 1–2 mm. longo, lamina elliptica vel oblonga, ciliata, 1–3 cm. longa, 0·6–1 cm. lata, apice obtuso, basi truncata vel rotundata vel in foliis inferioribus cuneata. *Pedunculi* terminales, 0·5–3·5 cm. longi. *Capitula* solitaria, ad 8 mm. alta, 16 mm. lata. *Involucrum* campanulatum, c. 6 mm. altum, 7 mm. latum, bracteis triseriatis, membranaceis, scariosis, late oblongis vel obovato-oblongis, apice rotundato. *Receptaculum* parvum, convexum, paleis membranaceis, anguste oblongis, c. 6 mm. longis, apice denticulatis. *Flosculi radii* 5; limbus corollae flavus vel luteus, siccitate saepe aurantiaco-ruber, ciliatus, obovatus vel rotundatus, c. 7 mm. longus, 6 mm. latus, supra papillosus, subtus minute glandulosus et in venulis ciliatus; tubus brevis, c. 0·5 mm. longus, 1 mm. latus; ovarium planum, obovatum, c. 4 mm. longum, 1·5 mm. latum, sparse pilosum et minute glandulosum. *Flosculi disci* rufo-fulvi, numerosi, hermaphroditi, steriles; pappus nullus; tubus corollae anguste infundibuliformis, c. 4·5 mm. longus, 1 mm. latus, lobis erectis anguste triangulatis, intus dense pilosis, extra glabris; antherae c. 1·5 mm. longae, basibus connatis, partibus superioribus liberis; stylus c. 5 mm. longus, subulatus, sursum minute hirsutus, apice minute bidentatus; ovarium anguste cylindraceum, c. 1 mm. longum. *Achaenia* (radii) obovata, compressa, extra ubique tuberculata, intus levia, marginibus incrassatis.

Mexico. State of Guerrero: District of Coyuca; Truchas, 19 July 1934, *G. B. Hinton* 6316; Coyuca, 10 July 1935, *Hinton* 8033; District of Mina: Placeres, 350 m., 23 July 1936, *Hinton* 9139; *ibid.*, 'wet hill—in the grass—grows up to about 600 m.', 12 Nov. 1936, *Hinton* 9830.

State of Michoacan: District of Huetamo, Mal Paso, 11 July 1935, *Hinton* 8036; District of Apatzingan, Apatzingan 300 m., 'flowers yellow', 14 Aug. 1938, *Hinton* 12016; *ibid.*, 450 m., 'flowers sulphur yellow', 17 Aug. 1938, *Hinton* 12038 (type).

This plant is peculiar in having sterile disc florets with practically undivided styles. In these characters it resembles the genus *Tragoceras* which, however, differs in having truncate, not subulate, styles, and ray florets with narrow claw-like limbs, not broad and velvety as in this plant. It appears therefore to be intermediate in its characters between *Zinnia* and *Tragoceras*.

Heliopsis purpurea *P. G. Wilson* sp. nov., *H. parvifoliae* A. Gray similis sed flosculis radii multo minoribus et disco purpureo differt.

Herba annua, erecta, ad 50 cm. alta. *Caulis* gracilis, ad basim glaber, sursum sparse (sed in partibus novellis dense) pilosus, internodiis ad 12 cm. longis. *Folii* petiolus gracilis, sparse pilosus, ad 3 cm. longus; lamina deltoidea vel rhomboidea, ad 6·5 cm. longa et 4·5 cm. lata, apice acuminato, basi truncata vel cuneata, tenera, utrinque minute pilosa, scabridula, remote argute serrata. *Pedunculi* terminales, graciles, appresse pilosi, ad 12 cm. longi. *Capitulum* solitarium, c. 0·7 cm. altum, 1·6 cm. latum; involucrum late campanulatum, bracteis biseriatis, oblongis, ciliatis, sparse pilosis, ad 3·5 mm. longis et 1·8 mm. latis, apice obtusis vel rotundatis, extra venoso-costatis. *Receptaculum* conicum, paleis anguste obovatis ad 3 mm. longis, apice purpureis, obtusis. *Flosculi radii* limbis rotundis luteis glabris c. 5 mm. longis et 3 mm. latis, ovario breviter oblongo ciliato. *Flosculi disci* hermaphroditi, corolla cylindrata c. 2·4 mm. longa, sursum purpurea, lobis obtusis apice minute glandulosis; antherae nigrae, c. 1·5 mm. longae; rami styli c. 0·8 mm. longi, breviter appendiculati; ovarium oblongum, ciliatum, c. 1·3 mm. longum. *Achaenia radii* obovoidea, triangularia, ad 3·5 mm. alta, 2·3 mm. lata, tuberculata, apice piloso, angulis exterioribus anguste sinuato-alatis sparse pilosulis. *Achaenia disci* obovoidea, tuberculata, apice pilosula.

Mexico. State of Mexico: District of Temascaltepec; Calera, 24 July 1935, *G. B. Hinton* 8096 (type); Anonas, 24 July 1934, *Hinton* 6326 (=6336?).

State of Guerrero: District of Coyuca; Cutzamala-Rancho, 13 Aug. 1935, *Hinton* 8166.

This plant is unusual in having purple disc florets and naked achenes. The former character is suggestive of the genus *Sanvitalia* which, however, usually has aristate achenes.

Rumfordia pinnatisecta *P. G. Wilson* sp. nov.; a speciebus adhuc cognitis foliis pinnatilobatis bracteis exterioribus multo angustioribus differt.

Herba annua (?), 1–1·5 m. alta. *Caulis* gracilis, rubro-fulvus, basi hispida, tum glabrescens, tum superne papillis inaequalibus albis apice glandulis brunneis terminatis dense indutus asperulus. *Folia* runcinato-pinnatilobata, 3–16 cm. longa, ad 5 cm. lata, dimidio inferiore ± anguste petioliformia irregulariter sinuato-lobata vel fere integra basi connato-perfoliata, dimidio superiore ambitu triangulari-pinnatilobata lobis ipsis ± irregulariter dentatis vel lobatis, supra viridia pilis basi tuberculatis scaberula, subtus pallida albescentia hirsuta et glandulis sessilibus praedita. *Inflorescentia* laxe paniculata, c. 20 cm. alta, bracteis linearibus 0·3–1 cm. longis, pedunculis indumento caulis glandulifero denso praeditis. *Capitula* 2–2·8 cm. lata, c. 1 cm. alta. *Involucrum* campanulatum bracteis exterioribus 5, linearibus, obtusis, reflexis, c. 4 mm. longis, utrinque papilloso-glandulosis, interioribus c. 5, erectis, obovatis, acutis, extra papilloso-glandulosis, intus glabris. *Receptaculum* convexum, paleis membranaceis bracteis interioribus similibus. *Flosculi radii* c. 5, lutei; lamina oblonga, c. 11 mm. longa, 5 mm. lata, apice bi- vel tri-dentato, basi cuneata; tubus hirsutus, c. 2 mm. longus; achaenium oblongum, glabrum, c. 2 mm. longum. *Flosculi disci* numerosi, lutei, corollae tubo hirsuto, c. 1·5 mm. longo, limbo glabro c. 4 mm. longo; antherae c. 4 mm. longae; styli rami hirsuti appendiculati, c. 2 mm. longi. *Achaenia*

nigra, obovoideo-oblonga, quadrangularia, glabra, c. 2·5 mm. longa, 1·1 mm. lata.

Mexico. State of Guerrero: District of Mina; Aguazarca-Filo, 'pine forest, 1 m. high, flower yellow', 30 Nov. 1937, *G. B. Hinton* 11289 (type); Armenia, 2340 m., 'pine forest, 1·5 m. high', 23 Oct. 1936, *Hinton* 9756.

This plant differs from other species of *Rumfordia* in having deeply lobed leaves and very narrow external involucral bracts. In the latter character it resembles *Siegesbeckia* in which, however, they are much longer; *Siegesbeckia* also has much smaller ray florets.

Eryngiophyllum pinnatisectum *P. G. Wilson* sp. nov., *E. rosei* Greenm. affinis sed foliis pinnatis vel bipinnatisectis differt.

Herba perennis; radix obconica, tuberosa, fibris densis vaginarum foliorum mortuorum coronata. *Folia* rosulata, pinnati- vel bipinnatisecta, ad 13 cm. longa, 4 cm. lata, rachide lineari ad 3 mm. lata sparse ciliata et subtus sparse pilosa, segmentis acutis similibus sed tantum ad 3 cm. longis rachide angustiore. *Scapi* complures, ad 14 cm. longi, igitur folia aequantes vel paulo excedentes, sparse pilosi, flexuosi, paulo infra medium bracteis foliaceis oppositis linearibus simplicibus vel trisectis ramulos abbreviatos monocephalos subtendentibus ad 2 cm. longis basi ciliatis praediti; pedunculi ad 8 cm. longi, saepe bracteolis 1–2 prope vel infra medium praediti, minute pilosi. *Capitula* 2·5 cm. lata, 1 cm. alta. *Involucrum* turbinatum vel semiglobosum; bracteae exteriores 5, herbaceae, anguste lanceolatae, ad 4 mm. longae, apice acuminato, ciliatae, basi gibbosa; bracteae interiores c. 12, imbricatae, membranaceae, elliptico-oblongae vel obovato-oblongae, acutae vel breviter acuminatae, ad 6 mm. longae, 2·5–3 mm. latae, siccitate purpurascentes. *Receptaculum* parvum, planum; paleae lineares, 5–6 mm. longae, 0·8 mm. latae. *Flosculi radii* feminei, corolla flava, venulis fusco-fulvis, tubo breviter cylindraceo, 1·2 mm. longo, lamina oblonga vel obovata, 9–12 mm. longa, 3–4 mm. lata, apice truncato 3–4-denticulato, basi cuneata; styli rami lineares, glabri vel ad apicem hirsuti, acuti, ad 1·7 mm. longi; ovarium pilosum, planum, oblongum, c. 2 mm. longum, 1·2 mm. latum, apice truncato, pappo nullo. *Flosculi disci* hermaphroditi, steriles; corolla rufo-fulva, tubo brevi c. 2 mm. longo, limbo campanulato c. 0·7 mm. longo, lobis breviter deltoideis; antherae lineares, 2·5 mm. longae, basi rotundata; styli rami subulati, hirsuti, ad 4 mm. longi; ovarium sterile, anguste cylindraceum, pilosum, ad 2 mm. longum. *Achaenia* obovoideo-obconica, 8 mm. longa, 3 mm. lata, dorso valde convexa, praecipue infra medium costata atque sulcata rugulosa, apice coronula rostriformi truncata excentrica incurva praedita.

Mexico. State of Guerrero: District of Coyuca; Arcelia, 15 Sept. 1934, *G. B. Hinton* 6598 (type); Chiripitiro, 5 July 1935, *Hinton* 8020; District of Mina, Anonas, 300 m., 'wet grassy hill, flower yellow', 27 July 1936, *Hinton* 9164.

This plant resembles *E. rosei* Greenm. in its habit and flower structure, but it differs in its fruit if, when Greenman wrote 'achenes subtriangular', he was referring to mature ray achenes. The leaves of *E. rosei* are apparently entire or nearly so. The root was insufficiently described and is not present on the isotype specimen at Kew.

Microspermum Lag., Gen. & Sp. Nov. 25 (1816). The type species of this genus is *M. numulariaefolium* Lag. l.c., which was described as having a naked receptacle with hermaphrodite florets (those of the ray having bilabiate corollas), and achenes with a pappus of 1–3 bristles. Bentham, in Pl. Hartw. 64 (1840), described a second species, *M. debile*, with similar characters but having naked achenes. In the Genera Plantarum **2,** 407 (1873), Bentham queried Lagasca's description of the pappus and suggested that *M. debile* and *M. numulariaefolium* were the same species. Bentham's generic description was more or less adopted by Hoffmann in Engl. and Prantl, Nat. Pflanzenf., **4,** 258 (1894), and by Axel Rydberg in N. Amer. Fl. **34,** 31 (1914), who made *M. debile* a synonym of *M. numulariaefolium* but gave the specific diagnosis of the former. Some recent collecting by Ynes Mexia and by G. B. Hinton, both in the District of Mina, Guerrero, has brought to light a plant which matches Lagasca's description and is distinct from Bentham's plant. Its identification as *M. numulariaefolium* is confirmed by comparison with a photograph of the type which is present in the Madrid Herbarium.

Two more species belonging to this genus have been found by G. B. Hinton, one in the State of Mexico, and the other in the State of Guerrero.

Key to Species.

Heads in a terminal panicle; leaves shortly petiolate, rotund-subcordate to broadly ovate.

Disc florets c. 5 mm. long; limb of corolla campanulate; achenes with 1–3 bristles . . . . . 1. *M. numulariaefolium*

Disc florets c. 3 mm. long; limb of corolla infundibuliform; achenes with 1–3 bristles . . . . . 2. *M. tenue*

Heads solitary; leaves distinctly petiolate, ovate to lanceolate.

Achenes naked; disc florets c. 3·5 mm. long; leaves ovate, bluntly serrate, to 3 cm. long . . . . . 3. *M. debile*

Achenes with a pappus of 2–3 bristles; disc florets c. 9–10 mm. long; leaves lanceolate, coarsely serrate, to 4·5 cm. long . 4. *M. flaccidum*

1. **M. numulariaefolium** *Lag.*, l.c.; DC. Prodr. **7,** 259 (1838); Hemsl. Biol. Centr.-Amer. Bot. **2,** 215 (1881); Rydberg l.c. quoad nom., excl. descr.

Mexico. State of Guanajuato: *Louis Née* (type in Madrid Herb. not seen, photograph in Kew Herb.).

State of Mexico: District of Temascaltepec; Chorrera, 1230 m., oak woods, 24 Sept. 1932, *G. B. Hinton* 1823; *ibid.*, 14 Oct. 1932, *Hinton* 2181; Socabón, 2320 m., oak woods, 28 Sept. 1932, *Hinton* 1859; Carboneras, 2000 m., oak woods, 15 Dec. 1932, *Hinton* 2795; District of Sultepec, Cumbre-Gavia, llano, 20 Oct. 1935, *Hinton* 8381.

State of Guerrero: District of Mina; Filo Aguarzarca, 1500 m., pine and oak forest, 'flower white', 11 Oct. 1936, *Hinton* 9671; *ibid.*, 28 Nov. 1937, *Hinton* 11281; Petlacala, 1880 m., floor of pine-forested slope, 'rays white, disc yellow', 15 Dec. 1937, *Ynes Mexia* 8968.

2. **M. tenue** *P. G. Wilson* sp. nov.; a *M. numulariaefolio* Lag. pedunculo tenuiore, flosculis minoribus, fauce flosculi disci infundibuliformi differt.

Herba annua, erecta, ad 20 cm. alta. *Caulis* tenuis, glanduloso- et eglanduloso-pilosus, internodiis 1·5–2·5 cm. longis. *Folia* late ovata, integra vel sursum trifida, petiolo ad 2 mm. longo; lamina serrata, utrinque pilosa atque glandulis sessilibus praedita, ad 9 mm. longa, 6·5 mm. lata, apice obtuso vel acuto, basi truncata. *Inflorescentia* paniculata, 12 cm. alta, 10 cm. lata; bracteae trifidae, segmentis late oblongis vel linearibus 1–4 mm. longis; pedunculi infra capitula tenues, 2–3 cm. longi. *Capitula* c. 4 mm. alta, 7 mm. lata. *Involucra* campanulata vel obdeltoidea, bracteis c. 10, uniseriatis, linearibus, acutis vel acuminatis, minute ciliatis et sparse glanduloso-pilosis, ad 2 mm. longis. *Receptaculum* parvum, convexum. *Flosculi* c. 30, albi, fertiles. *Flosculi radii* bilabiati, lobis 3 exterioribus c. 2 mm. longis, 2 interioribus c. 1 mm. longis, tubo anguste cylindrico c. 0·8 mm. longo; antherae c. 0·3 mm. longae. *Flosculi disci* medii fere regulares, exteriores ± irregulares, fauce obdeltoidea c. 0·7 mm. longa, lobis c. 0·4 mm. longis, tubo anguste cylindrico c. 0·9 mm. longo; antherae c. 0·3 mm. longae; styli rami c. 1 mm. longi. *Achaenia* anguste oblonga, c. 1 mm. longa, angulis sparse ciliatis, squamellis minutis et aristis 1 (rarius 2–3) c. 2·3 mm. longis coronata.

Mexico. State of Guerrero; District of Mina, Laguna-Tequeches, 1740 m., oak woods, 'flower white', 3 Dec. 1936, *G. B. Hinton* 9953 (type).

The florets of this plant show a gradual transition from the regular to the bilabiate condition; the throat differs from that of the other known members of this genus in being short and infundibuliform, not campanulate to cylindrical.

3. **M. debile** *Benth.*, Pl. Hartw. 64 (1840); Hemsl., l.c.—*Miradoria sartorii* Sch. Bip. ex Benth. in Benth. & Hook. fil. Gen. Pl. **2,** 407 (1873) pro syn. [*Microspermum numulariaefolium* (non Lag.) Rydberg l.c.]

Mexico. State of Oaxaca: Talea, 1840, *Hartweg* 474; Cordillera of Oaxaca, 8000 ft., pine districts, June 1840, *Galeotti* 2132; Cumbre de Tanitze, August 1842, *Liebmann* 548.

This was described by Bentham as having female ray florets but their anthers, although smaller than in the disc florets, appear to bear fertile pollen.

4. **M. flaccidum** *P. G. Wilson* sp. nov.; a *M. numulariaefolio* Lag. foliis lanceolatis capitulis solitariis, a *M. debili* Benth. foliis lanceolatis argute serratis pappo achaeniorum setifero, ab ambobus flosculis disci multo longioribus differt.

Herba perennis, decumbens; caulis gracilis, glanduloso-pilosus, internodiis 1–4 cm. longis. *Folia* opposita, utrinque sparse glanduloso-pilosa necnon pilis simplicibus eglandulosis saepius longioribus praesertim secus petiolos induta; petiolus brevis ad 5 mm. longus; lamina lanceolata vel rhomboideo-lanceolata, acuminata, basi attenuata, argute serrata, ad 4 cm. longa, ad 2 cm. lata. *Pedunculus* terminalis, 2–3 cm. longus. *Capitulum* solitarium, floribus omnibus hermaphroditis. *Involucrum* campanulatum, bracteis c. 12, 1–2-seriatis, subaequalibus, anguste lineari-lanceolatis, acuminatis, ciliatis, glanduloso-pilosis. *Receptaculum* convexiusculum, nudum. *Flosculi radii* limbo corollae valde aucto, lobis 3 exterioribus maximis ad 3·5 mm. longis, 2 interioribus multo minoribus c. 1 mm. longis; tubus anguste cylindricus, 2·5 mm. longus;

faux campanulata, c. 2·5 mm. longa; antherae 0·9 mm. longae; styli rami 2·2 mm. longi, apice hirsuti; achaenia oblonga, 4-angulata, angulis breviter hirsutis, aristis 2–3 debilibus minute barbellatis c. 6 mm. longis. *Flosculi disci* regulares, corolla anguste campanulata, 5·5 mm. longa, antheris 1·1 mm. longis, stylo achaenio atque pappo illis flosculorum radii similibus.

Mexico. State of Mexico: District of Temascaltepec; Nanchititla, cliffs, 13 Apr. 1935, *G. B. Hinton* 7616 (type).

ASCLEPIADACEAE

Gonolobus megalocarpus *P. G. Wilson* sp. nov.; *G. eriantho* Dcne. similis sed floribus majoribus et leviter tantum pubescentibus, faucis annulo ante sepala tantum ciliato differt.

Frutex volubilis; caulis gracilis, pilis patulis vel deflexis sparsis atque glandulis minutis subsessilibus praeditus, internodiis ad 25 cm. longis. *Foliorum* petioli ad 8 cm. longi, indumento ei caulis simili; lamina chartacea, ovata vel elliptica, ad 14 cm. longa, 8 cm. lata, supra parcissime minute pilosa val glabra, subtus minute glanduloso-pilosa, apice breviter accuminato, basi cordata, lobis basalibus rotundatis, sinu angusto vel occluso. *Inflorescentiae* singulae inter foliorum axillas ortae; pedunculus parviflorus, c. 3 cm. longus, indumento ei caulis simili; bracteae ellipticae vel lineares, 5–15 mm. longae, 1·5–5 mm. latae, acuminatae, utrinque minute glandulosae et subtus sparse hirsutae; pedicelli ad 5 cm. longi. *Flores* c. 4·5 cm. lati; calyx membranaceus, extra sparse pilosus, intus glaber, lobis ovatis obtusis, c. 1 cm. longis, 6·5 mm. latis; corolla rotata, profunde fere ad basin quinquelobata, subtus basi hirsuta, sursum glabra, supra basi minute pilosula aliter glabra, lobis lanceolato-oblongis acutis, c. 2 cm. longis, 5·5 mm. latis. *Gynostegium* peltatum; styli apex planus, quinquelobatus, c. 5 mm. latus; antherae horizontales, alis c. 2·5 mm. longis, appendicibus dorsalibus semirotundis, carnosis; corona annularis, c. 6·5 mm. diametro et c. 0·5 mm. alta, margine crenato; annulus faucis minutus, tenuis, ante sepala tantum ciliatus. *Fructus* oblique ellipsoideus, levis, glaber, valvis lignosis, ad 16 cm. longus, 6·5 cm. latus, 5 cm. crassus, apice obtuso, basi rotundata vel immaturus parum stipitatus, saepe excentricus. *Semina* plana, ovata, 1·3 cm. longa, 9 mm. lata, apice obtuso longe comoso, basi rotundata.

Mexico. State of Mexico: District of Temascaltepec; Tejupilco, 22 Dec. 1934, *G. B. Hinton* 7141 (type); *ibid.*, 28 Mar. 1932, *Hinton* 454; Cerro Muñeca, 2300 m., 18 July 1932, *Hinton* 1381; Luvianos, 10 Apr. 1934, *Hinton* 5899; *ibid.*, 'fruit edible very young', 26 Dec. 1934, *Hinton* 7164.

State of Oaxaca: 1842, *M. Ghiesbreght.*

Vernacular name: Chahuajote.

Pseudomarsdenia lanata *P. G. Wilson* sp. nov.; *Marsdeniae mexicanae* Dcne. affinis sed foliis subtus fructuque dense lanatis, gynostegio late turbinato differt.

Frutex volubilis; caulis dense molliter hirsutus, gracilis, internodiis c. 12 cm. longis. *Foliorum* petiolus hirsutus, ad 4 cm. longus; lamina mollis, ovata, ad 13 cm. longa, 10·5 cm. lata, supra velutina, subtus albido- vel griseo-lanata venis pilosis, apice breviter acuminato, basi cordata, lobis

rotundatis, sinu angusto. *Inflorescentiae* ex una axilla paris cujusque foliorum ortae, cymosae, pedunculo sericeo repetite dichotomo, congestiflorae, bracteis linearibus 1–2 mm. longis, pedicellis c. 2 mm. longis. *Flores* parvi; calycis lobi ovati, obtusi, ciliati, extra pilosi, intus glabri, c. 3·5 mm. longi, 2 mm. lati; glandulae calycinae singulae; corolla carnosa, campanulata, c. 4 mm. longa, 2 mm. lata, extra puberula, intus pilosa infra sinus loborum longe sursum barbata, inter sinus deorsum barbata, lobis late oblongis c. 1·5 mm. longis, 1·2 mm. latis, apice rotundatis. *Gynostegium* late turbinatum, c. 1·5 mm. altum; stamina subsessilia, alis brevissimis c. 0·5 mm. longis, membranis antherarum oblongis c. 0·4 mm. longis apice rotundatis, appendiculis basi antherarum incrassatis, corona aliter nulla. *Carpella* glabra; styli rostrum columnare. *Fructus* ellipsoideus, ad 11 cm. longus, 4 cm. latus, extra dense et longe lanatus. *Semina* ovata, plana, c. 1 cm. longa, 6 mm. lata, apice longe comoso.

Mexico. State of Mexico: District of Temascaltepec; Ixtapan, 1000 m., 'by the river', 23 July 1932 (fl.), *G. B. Hinton* 1158; Vigas, 26 Dec. 1934 (fr.), *Hinton* 7166; Bejucos 610 m., 'dry hill', 21 May 1933 (fl. & fr.), *Hinton* 3953; *ibid.*, 660 m., 23 Dec. 1933 (fr.), *Hinton* 5385; *ibid.*, 10 Apr. 1935 (fl. & fr.), *Hinton* 7602 (type).

State of Guerrero: District of Mina; Placeres, 350 m., 24 July 1936 (fl.), *Hinton* 9150; Cigarillo, 400 m., 'woods'; 25 Sept. 1936 (fr.), *Hinton* 9526; District of Coyuca, Pungarabato, 'on a copal', 1 July 1934 (fl.), *Hinton* 6265.

Gonzalez Ortega 4772, from N.W. Mexico, probably belongs to this species.

Vernacular name: Atuz.

This plant resembles *Marsdenia mexicana* Dcne. but, in addition to the characters given in the diagnosis, the flowers are densely barbate within and have no corolla appendages. The fruit is peculiar in being covered with a thick woolly indumentum.

NYCTAGINACEAE

Okenia parviflora *P. G. Wilson* sp. nov.; ab *O. hypogaea* Schlecht. et Cham. floribus multo minoribus, staminibus paucioribus differt.

Herba annua; caulis procumbens, ramosus, sursum villosus, 30 cm. vel ultra longus, internodiis ad 2 cm. longis. *Folia* opposita, inaequalia; petioli sparse villosi, 2–10 mm. longi, c. 0·3 mm. lati; laminae rotundae vel oblongae, marginibus undulatis vel sinuatis, nonnunquam obtuse pinnatifido-lobatis, basi truncata vel obtusa, 3–15 mm. longae, 2–9 mm. latae, utrinque glabrae vel subtus basi nervis villosis. *Pedunculi* axillares, uniflori, villosi, c. 0·5 mm. longi, post anthesin elongati ad 30 mm. vel ultra longi; bracteae 3, ovatae, acuminatae, c. 1 mm. longae, hyalinae, marginibus fulvis. *Flores* albi; perianthium anguste infundibuliforme, sparse puberulum, c. 7·5 mm. longum, limbo c. 2 mm. lato, costis 5 fulvis de sinibus inter lobos descendentibus, lobis rotundatis emarginatis c. 1 mm. longis; stamina c. 5, filamentis gracilibus perianthium aequantibus; ovarium oblongum, c. 0·4 mm. longum; stylus filiformis, stigmate capitato rotundato vix exserto. *Fructus* ignotus.

Mexico. State of Michoacan: District of Apatzingan; Tepalcatepec, 360 m. 'by the road', 25 Aug. 1938, *G. B. Hinton* 12101 (type).

State of Guerrero: District of Mina; Anonas, 200 m., 16 Aug. 1937, *Hinton* 10534; District of Coyuca, Paso de Arena, 6 June 1934, *Hinton* 6119; Pungarabato, 11 July 1934, *Hinton* 6277.

EUPHORBIACEAE

Acalypha erecta *P. G. Wilson* sp. nov.; *A. oligodontae* Muell. Arg. affinis, caule dense hispido, stylo multo longiore differt.

Herba annua vel perennis, 2 m. alta. *Caulis* erectus gracilis sulcatus, pilis longis patentibus necnon aliis brevissimis crispulis in lineis dispositis, internodiis 2–4 cm. longis; stipulae lineares, sparse setosae, 2–3 mm. longae. *Folia* alterna; petiolus hispidus, ad 5·5 cm. longus; lamina ovata, membranacea, 5-nervata, apice acuminato, basi rotundata vel subcordata, ad 9·5 cm. longa, 6 cm. lata, serrata vel crenato-serrata, utrinque adpresse pilosa. *Inflorescentiae masculae* axillares, pedunculo 1–1·5 cm. longo sparse hispido et adpresse piloso; spica anguste cylindrica, c. 3 cm. longa. *Inflorescentiae femineae* terminales simulque axillares, sessiles, anguste cylindricae; bracteae uniflorae, triangulatae, hispidae, c. 1 mm. longae; flores sessiles, sepalis triangulatis ciliatis c. 0·7 mm. longis, ovario triloculari hirsuto c. 0·6 mm. alto, stylis 3 rubris c. 4 mm. longis 6–8-laciniatis. *Inflorescentia fructigera* ad 15 cm. longa; bracteae 7-dentatae, c. 5 mm. latae, 4 mm. altae, stipitato-glandulosae, dentibus acuminatis c. 2 mm. longis; capsula triangulata, sparse hispida, c. 2 mm. alta; semina ovoidea, c. 1·4 mm. alta, 0·9 mm. lata.

Mexico. State of Mexico: District of Temascaltepec; Plaza de Gallos, 1200 m., llano, 27 Aug. 1933, *G. B. Hinton* 4596 (type); *ibid.* 14 Nov. 1935, *Hinton* 8732.

Acalypha trilaciniata *P. G. Wilson* sp. nov.; *A. pseudalopecuroidi* Pax et K. Hoffm. affinis, spicis masculis multo longioribus, bracteis florum femineorum profunde trilaciniatis differt.

Herba annua, c. 60 cm. alta. *Caulis* erectus, pilis aliis longis simplicibus patentibus, aliis multo brevioribus glanduliferis patentibus, aliis brevissimis crispulis adpressis vestitus, internodiis ad 6 cm. longis; stipulae lineares, minute ciliatae, c. 2 mm. longae. *Folia* alterna; petiolus gracilis, ad 8 cm. longus, indumento caulis praeditus; lamina ovata abrupte acuminata, basi anguste et breviter cordata, ad 8 cm. longa, 5 cm. lata, membranacea, 5-nervata, crenata vel serrata, utrinque satis sparse (infra densius) longe pilosa. *Inflorescentiae masculae* terminales et axillares, pedunculo gracili 3·5 cm. longo dense breviter stipitato-glanduloso et adpresse piloso, spica anguste cylindrica ad 5 cm. longa dense florifera. *Inflorescentiae femineae* axillares; pedunculus gracilis, c. 2 cm. longus; spica brevis, c. 1·5 cm. longa, 1·2 cm. lata, saepe apice setam flore femineo ex ovario uniloculari piloso constituto praeditam proferens; bracteae c. 6 mm. altae, in lacinias tres lineares profunde divisae, dense minute pilosae et stipitato-glandulosae; flores sessiles sepalis ovatis, minute ciliatis, c. 0·7 mm. longis, ovario stipitato-glanduloso, triloculari, stylis simplicibus c. 1·6 mm. longis; capsula minute pilosa; semina ovoidea, c. 1·2 mm. longa, 0·8 mm. lata.

Mexico. State of Michoacan: District of Apatzingan; 300 m., woods, 16 Aug. 1938, *G. B. Hinton* 12026 (type).

Notes on Alternanthera

R. Melville

1. The type of the generic name *Alternanthera*.

The genus *Alternanthera* was proposed by Forsskål in his Flora Aegyptiaco-Arabica (28, 1775), where he provided what amounted to a generico-specific description. No specific epithet accompanies the generic description, however, and it is easy to overlook the casually included epithet which appears among the list of *Triandria* on page LIX. The epithet is contracted owing to lack of space and appears as '*achyranth*'. This was interpreted as *achyranthes* by Christensen in his 'Index & Revision of Herb. Forsskål' (Dansk. Bot. Arkiv. **4** (3), 13, 1922) and as *achyranthoides* by Hiern (Cat. Afr. Pl. Welw. **4**, 896, 1900). Vahl (Symb. Bot. Pl. Forssk. **1**, 22, 1790) equated Forsskål's plant to *Illecebrum sessile* L. and this identity has been generally accepted. However, as several plants have been confused with the Linnean species a comparison of the specimens in the Forsskål and Linnean herbaria was thought advisable. I have to thank Professor K. Jessen for allowing me to borrow the Forsskål material to make the comparison.

Fig. 1. *Alternanthera sessilis* (L.) DC. from the Herb. Forsskål specimen no. 200, type of *A. achyranth.* Forssk. 1, floret with pair of bracteoles, adaxial side. 2, Median adaxial tepal. 3, 4, abaxial tepals. 5, lateral tepal. 6, Androecium, one anther remaining attached. 7, ovary. All scale A.

There are two sheets in the Forsskål Herbarium, nos. 200, 201, one bearing the locality, 'Rosettae'. They are conspecific but show some variation in leaf shape from elliptic acute to oblanceolate; both have small globular flower clusters. There are also two sheets in the Linnean Herbarium, numbered 290: 24, 290: 25. The first, from Suratt, has narrow linear-oblanceolate leaves and the flowers in globular or slightly elongated heads; the second from Hort. Upsal. has elliptic acute leaves and globular flower heads. The two Linnean specimens represent the same species as the Forsskål plants, the variation in leaf shape and size being well within that of the species, while the floral morphology is very consistent. The floral structure of the Forsskål plant is illustrated in Fig. 1. The three works cited by Linneaus in the Species Plantarum (Ed. 1, 225) under *Gomphrena sessilis* are consistent with a uniform conception of the species.

The necessary combination *Alternanthera sessilis* was not made by Robert Brown (Prod. Fl. Nov. Holl., 417, 1810) although it has often been ascribed to him. He merely pointed out that the transfer was necessary. De Candolle

correctly made the combination in 1813. The type species of *Alternanthera* is therefore *A. sessilis* (L.) DC. and the following names cited in chronological order are synonymous:

Gomphrena sessilis L. Sp. Pl. 225 (1753).

Illecebrum sessile L. Sp. Pl., ed. 2. 300 (1762).

Alternanthera achyranth. Forsskål, Fl. Aegypt-Arab. LIX, 28 (1775).

A. repens Gmelin, Syst. Nat. Ed. 13, **2** (1) 106 (1791).

A. sessilis (*L.*) *DC.* in Cat. Hort. Monspel. 77 (1813).

A. achyranthoides Forssk. apud Hiern in Cat. Afr. Pl. Welw. **4,** 896 (1900).

A. achyranthes Forssk. apud Christensen in Dansk Bot. Arkiv. **4** (3), 13 (1922).

2. *Alternanthera pungens* H.B.K., the correct name under *Alternanthera* of *Achyranthes repens* L.

Two weedy species of *Alternanthera* have been passing under the names *A. repens* (L.) O. Kuntze and *A. pungens* H.B.K. The plant commonly known as Khaki weed in Australia had generally been identified as *A. repens*, but recent specimens from Western Australia and South Australia were found to match material determined as *A. pungens* by K. Suessenguth, the latest authority on the genus. The question was then raised as to which of these species should rightly bear the name *A. repens*.

The combination *Alternanthera repens*, as often cited from O. Kuntze in his Revisio Generum Plantarum **2,** 540 (1891), was based on *Achyranthes repens* L., Species Plantarum 205. The descriptive phrase used by Linnaeus: '*Achyranthes caule repente, capitulis lateralibus sessilibus*', is inadequate to discriminate the two plants. No help can be obtained from the Linnean herbarium which contains no specimen of the plant (Savage, Cat. Linn. Herb., 287). Linneus, however, included a single reference to earlier literature as follows:

'Achyranthes repens, folii bliti pallidi. Dill. elth. 8. t7. f7. Habitat in Turcomania. ☉'

Dillenius in his Hortus Elthamensis (1732) provided a lengthy description of his plant. Under the phrase name 'Achyracantha repens, foliis bliti pallidi', he gave a good figure of the habit, but the drawings of the flowers, being of little more than natural size, are of no critical value. The description, also, in spite of its length, does not give precise information about critical characters, so that the identity of the plant could only be settled by reference to a specimen. Druce and Vines in their account of 'The Dillenian Herbaria' (158, 1907) stated that the specimen could not be found. Dillenius herbarium was not preserved as a distinct unit, but was distributed through the Sherardian herbarium. As it was thought that recent work on this herbarium might have brought to light the missing specimen, enquiry was made of Dr. E. F. Warburg, Curator of the Druce Herbarium, Oxford. Not only has the specimen from the Eltham garden been discovered, but also the original plant collected by Dr. Mylam and referred to by Dillenius, from which, presumably seeds were obtained to grow in the garden. I am much indebted to Dr. Warburg for allowing me to borrow these specimens for detailed study.

Both the native and the garden specimens are clearly labelled '*Achyracantha Bonariensis repens foliis Bliti pallidi* H. Elth.' The garden plant is marked 'Eltham Garden' and the native one: 'from Buenos Ayres by Mr. Mylam 1726'. In the light of subsequent events, it is significant that Dillenius dropped the word 'Bonariensis' from his phrase name in the 'Hortus Elthamensis', which then gave no guidance to Linneus as to the country of origin of the plant. Dillenius' published statement was, however, quite explicit, thus: 'Plantae hujus specimina D. Gul. Sherardo p.m. misit Dr. Mylam, ex Tucumaniae regionis Metropoli (Buenos Ayres) ubi pro Anglorum Societate Australi Medicum & Chirurgum agebat.' Linneus confused the name of the province, mis-spelling it as 'Turcomania'. This gave the false impression that the plant came from Asia, and probably was the reason why, at some later date, the two sheets were stamped by a rubber stamp using a methyl violet ink with the words, 'Herb. Sherard. Asia'. The date of the misplacing of the specimens may well have been in the middle of the nineteenth century when this ink came into use. The failure of Druce and Vines to find them can be accounted for by the fact that the specimens were not in their correct place in the herbarium.

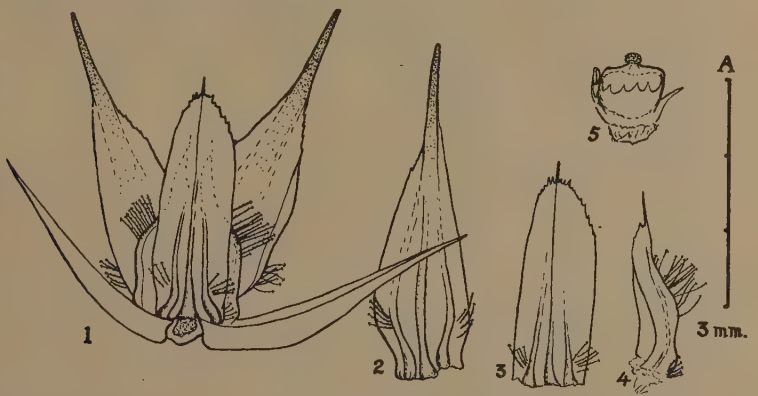


FIG. 2. *Alternanthera pungens* H.B.K. from the type of *Achyranthes repens* L., the Dillenian specimen in Herb. Sherard, Oxford. 1, floret with pair of bracteoles, adaxial side. 2, one of the abaxial pair of tepals. 3, median adaxial tepal. 4, lateral tepal. 5, androecium and ovary, one anther remaining attached. All scale A.

The Eltham Garden sheet bears two good flowering sprays 20–30 cm. long. The left hand spray bears such a close resemblance to the figure in the 'Hortus Elthamensis' that there can be little doubt that it was used in the preparation of the plate. This sheet, then, is the holotype of *Achyranthes repens* L. The native sheet also bears two sprays, which are 33 cm. long. They represent the same species, but are more vigorous, having leaves up to 6 cm. long and 3·5 cm. wide, compared with a maximum of 3 × 2 cm. in the Eltham plant. Other native specimens show an even greater range of leaf size.

A flower dissected from the type is illustrated in the accompanying figure. (Fig. 2). At the base is a pair of slender concave acute bracteoles, about $\frac{3}{4}$ as long as the pair of large abaxial tepals. The latter have well developed spiny points which account for about $\frac{1}{3}$ of their length. The

median adaxial tepal is almost parallel sided and has only a short weak point. The two lateral inner tapals are about $\frac{4}{5}$ the length of the median tepal. They are arched, and bear a group of glochidiate hairs about the middle of the keel and a few very short ones at the base. The two outer and the median tepals also bear pairs of small tufts of short glochidiate hairs near their bases.

The combination *Alternanthera repens* (L.) was first made by Link in Enum. Pl. Hort. Berol **1,** 154 (1821), but unaware of this, O. Kuntze again proposed it in 1891. It is invalidated, however, by the earlier homonym *A. repens* Gmelin (Syst. Nat. Ed. 13, **2** (1) 106, 1791), which was proposed for Forsskål's generic type, *A. achyranthoides* Forssk. The earliest available name for the Linnean species appears to be *A. pungens* H.B.K. I am greatly indebted to Dr. Alicia Lourteig for making a search in the herbarium at the Museum National d'Histoire Naturelle, Paris, which resulted in the discovery of a syntype of Humbolt and Bonpland's species and to the Director of that institution for allowing me to borrow the specimen. Comparison with the Dillenian plant (Fig. 2) has proved that the two are conspecific. A list of the synonymy of this species is appended.

Achyranthes repens, folii bliti pallidi. Dill. Hort. Elth. 8, t7, f7. (1732).

Achyranthes repens L. Sp. Pl. 205 (1753) (Oxf. Holo.!).

Illecebrum achyrantha L. Sp. Pl., ed. 2, 299 (1762).

Achyranthes mucronata Lam. Dict. **1** 547 (1785).

Achyranthes radicans Cav. Anal. Ci. Nat. **3,** 27 (1801).

Paronychia achyrantha (L.) Desf. Tabl. Bot. 44 (1804).

['*Alternanthera achyrantha* (L.) R. Br. Prod., 417 (1810)' apud auct. plur.] R. Brown did not make this combination.

Pityranthus crassifolius Mart. in Denks. Akad. Münch. **5,** 179 (1817).

Alternanthera pungens *H.B.K.* Nov. Gen. et Sp., **2,** 206 (Feb. 1818) (P. Iso.!).

Alternanthera achyrantha (L.) Sweet, Hort. Suburb. Lond. 48 (1818).

Alternanthera echinata Sm. in Rees Cycl. Suppl., no. 10 (1819) (Linn. Holo.!).

Celosia echinata Humb. & Bonpl. in R. & S. Syst. Veg. **5,** 531 (1819).

Alternanthera repens (L.) Link, Enum. Pl. Hort. Berol. **1,** 154 (1821), non Gmelin (1791).*

Illecebrum pungens (H.B.K.) Spreng. in Spreng. Syst. **1,** 820 (1825).

Telanthera pungens (H.B.K.) Moq. in DC. Prod. **13** (2), 371 (1849).

Alternanthera achyrantha (L.) Sweet var. *leiantha* Seub. in Mart. Fl. Bras. **5** (1), 183 (1875).

Alternanthera repens (L.) O. Kuntze, Rev. Gen. Pl. **2,** 540 (1891).

Achyranthes leiantha (Seub.) Standley in J. Wash. Acad. Sci. **5,** 73 (1915) et N. Amer. Fl. **21** (2), 135 (1917).

Alternanthera leiantha (Seub.) Alain in Contrib. Ocas. Mus. Hist. Nat. Col. 'de la Salle', Habana No. 9, 1 (1950).

* A. Burkart in Darwiniana **11,** 380, t 1 (1957), received while the present paper was in the press, has overlooked Gmelin's homonym.

3. *Alternanthera peploides* (Humbolt & Bonpland ex Roem. & Schult.) Urban.

The second of the species pair confused under the name '*Alternanthera repens*' is native to the West Indies, Central America and the southern part of the United States. It differs from *A. pungens* H.B.K. in the shorter and much less indurated spiny tips of the tepals, in the ovate acute, instead of oblong, median adaxial tepal, in the far more numerous glochidiate hairs on the tepals and in the much greater length of the staminal filaments and staminodes. (Compare figs. 2 & 3). In fig. 3, the androecium has been drawn from a syntype of *A. achyrantha* var. *parvifolia* Moq., which is conspecific, as it was in better condition than that of the fruiting specimen from Herb. Willdenow.

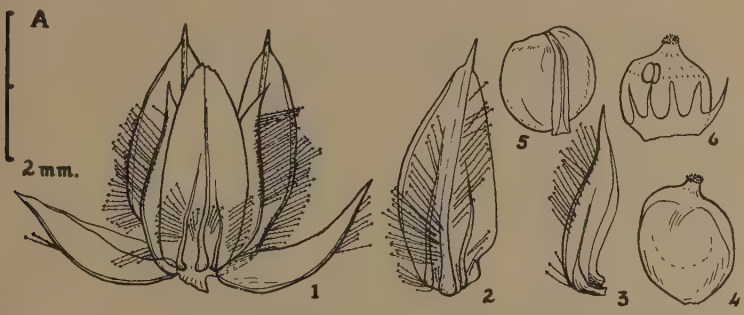


FIG. 3. *Alternanthera peploides* (Humbolt & Bonpland ex Roem. & Schult.) Urban, from the type specimen, Herb. Willd. 5064. 1, floret with pair of bracteoles, adaxial side. 2, one of the abaxial pair of tepals. 3, lateral tepal. 4, fruit. 5, seed. 6, androecium and ovary, one anther remaining attached—from Herb. Boiss., Cadiz, 1837, syntype of *A. achyrantha* var. *parvifolia* Moq. in Herb. Kew. All scale A.

The earliest name for this plant appears to be *Illecebrum peploides* Humbolt et Bonpland ex Roem. et Schult. Syst. **5,** 517 (1819). Urban discussed the type specimen in the Willdenow Herbarium (Willd. no. 5064) and made the necessary combination under *Alternanthera* in Fedde Rep. **15,** 168 (1918). He also gave good reasons for believing that the specimen was collected by Poiteau in Haiti and not by Humbolt and Bonpland in St. Domingo. I am indebted to Professor Dr. E. Werdermann and Professor Dr. Th. Eckardt of the Botanischer Garten und Museum Berlin-Dahlem for photographs of the type specimen and for their generosity in presenting a flower cluster from it to the Kew Herbarium, which has enabled me to check the application of the name. The more important synonyms are listed below.

Illecebrum peploides Humbolt & Bonpland ex Roem. & Schult. Syst. Veg. **5,** 517 (1819). (B, Holo. Willdenow 5064!).

Alternanthera villiflora Scheele in Linnaea **22,** 149 (1849) (K. Iso. Lindheimer 512!).

Alternanthera achyrantha (L.) Sweet var. parvifolia Moq. in D.C. Prod. **13** (2), 358 (1849) (K. Syn. Herb. Boiss. Cadiz 1837!).

Alternanthera repens Urb. Symb. Antil. **4,** 221 (1905) in part, non (L.) Link.

Alternanthera parvifolia (Moq.) Fawcett & Rendle, Fl. Jam. **3,** 139 (1914).

[*Achyranthes repens* Standley, N. Amer. Fl. **21** (2), 136 (1917) in part, non L.].

Alternanthera peploides (*Humbolt & Bonpland*) *Urban* in Fedde Rep. **15,** 168 (1918).

A New Subspecies of Indigofera asparagoides

J. B. Gillett

I. asparagoides *Taub.* ssp. **ephemera** *Gillett*, ssp. nov.

Ab ssp. *asparagoidei* ut infra differt.

ssp. *asparagoides*	ssp. *ephemera*
1. Herba perennis, radice lignosa.	Herba annua.
2. Sparse strigosa vel subglabra.	Glabra.
3. Folia fertilia (racemos subtendentia) 2–5-jugata.	Folia fertilia simplicia vel 1–3-jugata.
4. Racemi 2–10-flori.	Racemi 1–2-rarissime 3-flori.
5. Corolla ad 6 mm. longa.	Corolla ad 4 mm. longa.
6. Legumen 12–24 mm. longum.	Legumen 8–14 mm. longum.
7. Semina 8–15.	Semina 5–8.

Tanganyika. Mbeya district: 1650 m., flowers pinkish, common, 23.3.1932, *R. M. Davies* 87; Mbosi, Mkoma, 1500 m., hillsides, common, 7.4.1932, *R. M. Davies* 526; c. 6·5 km. from Mbeya on Tukuyu Rd., 1680 m., 12.5.1956, *Milne-Redhead & Taylor* 10197 (K, holo., EA, BR, B, LISC, isotypes). Songea District: E. slopes of Candamara Hill, c. 6 km. N. of Songea, 1180 m., gravelly soil between rock outcrops in open places, stems reddish below, green above, rather zigzag, cotyledons persisting, pedicels tinged reddish purple, calyx pale green with very fine reddish purple reticulations, standard inside and wings pale salmon, base of standard white with mauve edge, base of wings and apex of keel bright salmon, rest of keel greenish white, 23.3.1956, *Milne-Redhead & Taylor* 9333; Matagoro Hills, just S. of Songea, 1410 m., poor gravelly soil on steep slope in *Brachystegia-Uapaca* woodland, 14.6.1956 fruiting, *Milne-Redhead & Taylor* 9333/A.

N. Rhodesia. Near Abercorn. Bush below dogs' graves, Chilongowelo, 1440 m., on bank on stony loam, flowers bright rose, 4.3.1952, *Mrs. Richards* 873; fire break above Katula farm, 1530 m., in open sunny spots on sandy soil, flowers bright pink, 19.4.1952, *Mrs. Richards* 1459; fire break towards Kasulu top escarpment, 1500 m., sandy yellow soil, fairly common, 14.3.1955, *Mrs. Richards* 4919; ibid. May 1955 fruiting, 4919/B; Inono valley, top of escarpment above pineapple farm, 1500 m., sand among rocks, flower pink, 13.4.1955, *Mrs. Richards* 5408.

Ssp. *asparagoides* occurs in Eastern and South-Eastern Belgian Congo, Uganda, Nyanza province Kenya, Lake province and Ufipa district Tanganyika and at Mwinilunga, Mpika and Shiwa Ngandu in N. Rhodesia. The two sspp. thus do not, apparently co-exist in any area and it is largely on this account that the opinion that ssp. *ephemera* is merely ssp. *asparagoides* flowering in its first year is here rejected. However it is desirable that this possibility should be tested by experimental cultivation, especially as two specimens collected by Mrs. Richards in the Ufipa district: 8558 from Chapota and 8972 from Ilemba are intermediate.

In my treatment of *I. asparagoides* in Kew Bull. Add. Series 1: 135 (1958) I failed to discriminate between its two subspecies and I am indebted to Mr. Milne-Redhead, who has collected both, for drawing my attention to them.

Notes on African Capparidaceae: II

R. A. Graham

New Species in Cleome.

Cleome grata *R. A. Graham*, sp. nov. *C. hirtae* (Klotzsch) Oliv. affinis sed seminibus minoribus puberulentibus et gynophoris quam pedicellis semper longioribus differt.

Holotypus: Kenya, Melka Rupia (near R. Tanga, about 80 km. downstream from Grand Falls, *Mrs. J. Adamson* 616 (K!)).

Herba ?annua valde viscosa ramosa. Caules virides infra ± albescentes pilis glanduliferis dense obtecti. Folia 5–7-foliolata, 1–3 cm. petiolata; foliola anguste linearia vel lineari-oblanceolata vel lineari-elliptica, apice ± obtusa, 1–2·7 × 0·1–0·2 cm., dense glanduloso-viscosa. Inflorescentia venusta, c. 15 cm. longa, bracteis ut foliis sed gradatim apicem versus valde minoribus ornata. Pedicelli 8–12 mm. longi, glandulosi, punicei. Sepala 6–8 mm. longa, lineari-lanceolata, externe dense glandulosa interne glabra. Petala magenta-punicea, superiores flavo-maculata, 1·8–2·5 (–3) cm. longa, longe unguiculata, lamina ± oblongo-lanceolata. Stamina 7, filamenta pallide punicea, inferne glandulosa, 1·3–3 cm. inaequilonga; antherae c. 3·5 mm. longae. Gynophorum 2–2·5 cm. longum quam pedicellus longius, dense stipitato-glandulosum. Fructus siliquiformis 7–9 cm. longus, ut gynophorum glandulosus, valvae c. 10-nervatae. Semina ± rotunda, 1–1·25 mm. diametro, minute puberula, striis multis longitudinalibus, et transversis valde paucioribus majoribus irregularibus instructus.

Also recorded from:—Kenya; Northern Frontier Province: Waji, *Hemming* 439 (K!); Dida Galgalla Desert, *J. G. Williams* (EA No. 11032!); E. side of Lake Rudolf, *Mearns* 122 (BM!) and *Wellby* s.n. (K!); Turkana District: Turkwall Valley, *Champion* T. 61 (K!); near Lodwa, *Mortimer* T. 107 (K!, EA!), and *Lake Rudolf Expedition* 157 (EA!); Lake Rudolf Central Island, *Worthington* s.n. (BM!), and *Padwa* 165 (K!), and *Lake Rudolf Expedition* 150 (K!); Meru District: Isiolo, *Bally* 3720 (K!); Kitui District: Sosoma, *Edwards* s.n. (EA No. 10927!); Somaliland; *Donaldson Smith* s.n. (BM!).

This attractive species has a strong outward resemblance to *C. hirta* (Klotzsch) Oliv., but differs in its smaller, minutely puberulent and differently ornamented seed, by its fewer stamens, and by its gynophores invariably exceeding the pedicels. There is variation in the stem and leaf indumentum: the stems sometimes having stalked glands instead of glandular hairs (*Mearns* 122; *Champion* T. 61; *Mortimer* T. 107; *Lake Rudolf Expedition* 157 and 150; *Padwa* 165; *Worthington* s.n.; *Donaldson Smith* s.n.; *Wellby* s.n.), and sometimes being glabrous or almost so (*Edwards* s.n.); and in some cases the lower parts of the stems become bleached-white with maturity. The leaves vary from densely glandular to glabrous.

Wellby s.n. is one of the syntypes of *C. gallaënsis* Gilg and Benedict, a species which appears, from its type specimens, to be founded on at least two species and possibly three.

Cleome parvipetala *R. A. Graham*, sp. nov. *C. hanburyanae* nonnihil affinis sed virgatior, habitu suffruticosa, foliis floribus petalis capsulisque minoribus.

Holotypus: Kenya, Turkana District, steep slope 17·6 km. [from the] Moroto Turn-[off to] Lodwar, *Verdcourt* 803 (K! sheet I, EA! sheet II)

Herba annua vel perennis virgatissima. Caules infra c. 1 cm. crassi lignosi glabri; rami virgati ± lignosi ad c. 3 mm. crassi viridi-rubescentes glandibus stipitatis multis instructi. Folia plerumque 5-foliolata, 1–3 cm. petiolata; foliola parva, elliptica, obovata vel obovato-elliptica, 6(–7) × 2 mm. apice obtusa vel rotunda, basi angustata, glandibus stipitatis ± dense obtecta; petiola foliis delapsis pallide brunnescentia. Inflorescentia ad c. 10 cm. longa, bracteis ut foliolis sed minoribus saepe trifoliolatis ornata. Pedicelli 3–6 mm. longi. Sepala lineari-lanceolata, glandulosa, 4–5 mm. longa. Petala c. 10 mm. longa, longe unguiculata, lamina anguste oblonga vel oblongo-ovata, apice obtusa. Stamina 7, filamenta inaequalia, 9–15 mm. longa, purpureo-punicea; antherae c. 1·5 mm. longae. Gynophorum 1–1·2 cm. longum, quam pedicellus longius. Capsula siliquiformis 1·8–2·5 cm. longa striis multis glanduliferis et apice stylo 3–4 mm. longo aucta. Semina ± rotundo-reniformia, 1–1·25 mm. diametro, striis longitudinalibus parvis multis et transversis majoribus undulatis ± cristatis ornata.

Additional records are: KENYA; Northern Frontier Province: *Merrell Dalton* 15 (K!); Furroli, *Gillett* 13845 (K!, EA!); Turkana District: Oropoi Valley, *Liebenburg* 290 (K!); Lodwar Flats, *Bally* 1140 (K!); Turkana desert, *Pole Evans and Erens* 1559 (K!); near Loya, *Popov* 1520 (EA!); Lokolyo, *Dale* K. 332 (EA!); Kakema, *Lake Rudolf Expedition* 127 (EA!); SUDAN; near Moru Yakipi, Mukwecha Waha, *Myers* 14002 (BM!).

This very twiggy species has very small, mainly 5-foliolate leaves, the leaflets up to 11 × 4 mm. The petioles appear to remain in a dried, light brown state after the leaves have fallen. The two upper petals have a yellow eye, not readily discernible in the holotype. There is some resemblance to *C. silvatica* in the shape and indumentum of the capsules, but the seed of this lacks the cristate transverse ridges, and the leaves are larger, the herb less shrubby. It is told from *C. stenopetala* by the fewer stamens and more glandular-hairy pods. But it is most closely allied to *C. hanburyana* from which it differs in its twiggier habit, smaller size of all its parts, and in the ornamentation of its seed whose transverse ridges, although cristate, are not so eminently so as in *C. hanburyana*, and whose diametric measurement is smaller than in the latter species. North of Kenya, forms occur which combine the stature of *C. hanburyana* with the seed ornamentation of *C. parvipetala*, and intermediacy in other characters, such as leaf size, can be found. It is possible that each is an ecotypic variant of the other, but in view of the differences—which may point to active speciation—it is thought best to offer *C. parvipetala* in specific rank.

Cleome parvula *R. A. Graham*, sp. nov. *C. usambaricae* nonnihil affinis sed floribus valde minoribus fructibus brevioribus staminibus 5 tantum et foliis semper trifoliolatis distinguitur.

Holotypus: Tanganyika, Mpwapwa District, Godegode Kopje, *B. D. Burtt* 4570 (K, holo.!; BM, iso.!; EA, iso.!).

Herba annua ± diffusa ramosissima praeter pedicellos glaber c. 45 cm. alta. Caulis ramique subtenues virides sulcato-striati. Folia trifoliolata 1–2 cm. petiolata; foliola subsessilia parva, 5–15 × 3–8 mm. elliptica vel rhomboideo-elliptica, apice acuta mucronata basi angustata. Inflorescentia ad c. 15 cm. longa tenuis ut videtur ± arcuata, bracteis simplicibus ± ut foliolis sed minoribus nonnunquam rotundioribus instructa. Pedicelli filiformes 4–6 mm. longi (fructiferi ad 8 mm.), glandibus breviter stipitatis

muniti. Sepala minuta lanceolata, 1–1·5 mm. longa. Petala pallide punicea unguiculata, c. 4·5 mm. longa. Stamina 4–5 mm. longa, duo aliis paululum longiora; antherae c. 1·6 mm. longae. Gynophorum pedicello brevius, c. 4 mm. longum. Capsula siliquiformis, 2·5–3 cm. longa, longitudine striata, apice in stylum ± 2–3 mm. longum angustata. Semen c. 1 mm. diametro glabrum brunneum ± rotundum striis multis longitudinalibus et transversis ornatum

An additional record, from the same district, is Gulwe Mtn., *Hornby* 781! Both this and the type material are from rocky and presumably dry ground, in one case with a northern aspect, and from 900–960 m. altitude.

The available material shows no variation of importance. In the isotype the leaflets attain 3 × 1·2 cm., but in other features both this and *Hornby* 781 are very much the same as the holotype.

Cleome burttii *R. A. Graham*, sp. nov. *C. usambaricae* affinis sed fructibus gynophorisque brevioribus, floribus minoribus, seminum testae forma et habitu tenuiore differt.

Holotypus:—Tanganyika, Mwapwa District, Matomondo and Godegode, Feb. 1933, *B. D. Burtt* 4631 (K!, two sheets).

Herba annua tenuis gracilis ramosa plerumque glabra ad c. 30 cm. alta. Caulis viridis glaber vel glandibus breviter stipitatis paucissimis instructus. Folia trifoliolata 1–4·3 cm. petiolata; foliola acutissima, elliptica vel late elliptica, basi angustata, 2·5–5·8 × 0·8–2 cm., praeter margines ciliolatos glabra. Inflorescentia ad c. 15 cm. alta bracteis simplicibus ut foliolis sed valde minoribus (supremis minimis) ornata. Pedicelli filiformes rubro-punicei stipitato-glandulosi 8–10 mm. longi. Sepala rubro-punicea, linearilanceolata apice subfiliformia, c. 3 mm. longa apud margines glandulosa. Petala punicea, superiora ((?) flavo-) maculata, unguiculata, 7–10 mm. longa, lamina anguste oblonga apice obtusa. Stamina 7, 5–8 mm. inaequilonga; antherae 1–1·25 mm. longae. Gynophorum pedicello brevius (vel aliquanto aequilongum) 4–6 mm. longum. Capsula siliquiformis glaber 4–5·5 cm. longa multi-(7-8)-striata apice angustata, stylo persistente acutissima. Semen 1·25–1·5 mm. diametro, ± rotundum, striis longitudine parvis et transverse paucioribus eminente cristatis undulatis irregularibus ornatum.

This graceful species, which has a markedly cristately-ridged seed, is recorded also in Mpwapwa District from the E. end of Kimagai Swamp (*Hornby* 741 (K!)), and in Moshi District from Mbuyuni, June 1951, (*Corbett* 16 (K!)). The holotype (six specimens mounted on two sheets) is recorded from 'shade of *Commiphora–Cordyla* thicket'. The altitude range is 900–1350 m. *Hornby* 741 has seed rather larger (1·75 mm. diameter) than those of the holotype, and with gynophores up to 8 mm. long, nearly equalling the pedicels.

A Cultivated Species of Cassia Allied to C. javanica

J. P. M. Brenan

A cassia, under the name *C. nodosa* Buch.-Ham. ex Roxb., has been in cultivation at the Botanic Garden at Entebbe in Uganda. It is represented in the Kew Herbarium by a specimen, *Snowden* 1849, whose label states: 'spreading tree 20–30 feet; flowers large, whitish when young, rose pink when fully open, decorative, sweet scented'. The same cassia, under the same name, is also in cultivation at Yangambi in the Belgian Congo (*Gilbert* 10506), and probably in other African territories besides. It does not, however, agree with *C. nodosa* nor with the closely related *C. javanica*.

This plant is also cultivated elsewhere; there are specimens of it at Kew from India, Ceylon, North Borneo and Barbados. De Wit has revised the cassias of Malaysia in Webbia **11,** 197–292 (1955), and according to this account the plant is *C. javanica* L. var. *agnes* De Wit (*l.c.* 220). The variety was described from a cultivated plant in North Borneo (*Cuadra* 3049), of which there is an isotype at Kew. De Wit stated (*l.c.*, 222) that var. *agnes* was 'only known cultivated. Possibly wild in the North or Northeast of the Deccan Peninsula'. There are, however, at Kew numerous specimens from Siam, Indo-China and Cochin China clearly referable to var. *agnes*; examples are: *Thorel* 980, *Godefroy* 309 and *Talmy* 56 from Cochin China, *Squires* 802 from Indo-China, and *R. Schomburgk* 121 and *Kerr* 10676 from Siam. Some, at least, of them appear to come from native localities, and the original home of var. *agnes* is presumably in that corner of Asia.

The characters of var. *agnes* are well maintained in this material, in particular the structure of the inflorescence in which the racemes are aggregated into terminal corymbs borne on leafy shoots. This contrasts strongly with *C. javanica* and *C. nodosa*, in which the racemes are simple or subsimple and borne on short normally leafless shoots arising laterally from the older twigs. This, taken in conjunction with the other differences in foliage mentioned by De Wit, makes it desirable for var. *agnes* to be recognised as a distinct species:—

Cassia agnes (*De Wit*) *Brenan*, sp. nov.

C. javanica L. var. *agnes* De Wit in Webbia **11,** 220 (1955).

The anthers of the longer stamens are described by De Wit as glabrous. They are in fact sparsely pubescent, as shown by examination of the isotype, *Cuadra* 3049.

There can be little doubt that *C. javanica* L. var. *indochinensis* Gagnep. in Lecomte, Fl. Gén. Indo-Chine **2,** 158 (1913), is also referable to *C. agnes*. This variety was referred by De Wit, with doubt, to *C. bakeriana* Craib, but the description of var. *indochinensis*, in particular the mention of the corymbose inflorescence, points clearly to *C. agnes* and not to *C. bakeriana*, which has simple, not aggregated racemes. Also some of the specimens cited (without numbers) by Gagnepain under var. *indochinensis* are almost certainly duplicated among the Kew material of *C. agnes*.

A Japanese Species of Sphagnicola Velenovsky

R. W. G. Dennis & R. P. Korf*

Dennis (1956) suggested that a small number of species formerly assigned to the genus *Ombrophila* Fr. might appropriately be segregated in a new genus for which he proposed the name *Pseudodiscinella*. One of these species had, however, been earlier included by Velenovsky (1934) in his genus *Sphagnicola*. As originally circumscribed the latter contained three species, *S. ciliifera* (Karst.) Vel., with a variety *nuda* Vel., *S. rivularis* Vel. and *S. marchantiae* Vel. Velenovsky did not designate a type species for *Sphagnicola* but his generic diagnosis seems to have been inspired largely by *S. ciliifera*, the only one of the three to be described at all fully by him. It seems best, therefore, to select it as the type species of the genus, in which case *Pseudodiscinella*, of which it was also the type species, becomes an obligate synonym of *Sphagnicola*.

Recently one of us (R.P.K.) has collected in Japan abundant material of an apparently undescribed fungus referable to this genus, viz.:

Sphagnicola iodocyanescens *Dennis et Korf*, spec. nov.

Apothecia sparsa, sessilia, subflava, latit. 3·5 mm., glabra, excipulo parenchymatico e cellulis confertis polygoniis 15–25μ diam. constituto, excipulo basi ascomatum gelatinoso, J cyanescente. Asci clavati, octospori, 100–120 × 12–15μ. Ascosporae distichae, ellipsoideo-elongatae vel incurvatae, guttulis 2–4 majoribus praeditae, hyalinae, 16·5–20 × 4·5–6·5μ. Paraphyses filiformes, crassit. 2–2·5μ. Supra folia, virgulta corporaque varia putrida, prope Obama, Nagasaki, Kyushu, Japan. R. P. Korf 308 (Typus).

Apothecia when fresh up to 3·5 mm. diameter, glabrous, margin entire, convex-discoid, translucent, of a waxy-gelatinous consistency; hymenium buff-coloured, exciple concolorous; contracting greatly and becoming darker on drying.

Hypothecium fairly well differentiated, about 100μ thick, pink in KOH-phloxine-glycerine mounts, composed of very irregular cells about 10μ diameter, almost forming a 'textura epidermoidea'; medullary excipulum about 550μ thick, of very irregular hyphae 2–12μ diameter, forming a tight 'textura intricata' or appearing almost pseudoparenchymatous in section, almost colourless in KOH-phloxine-glycerine mounts, bordered at the sides of the apothecium by the ectal excipulum and towards the base by the gel layer. Ectal excipulum 50–75μ thick along the sides, composed of 'textura angularis', individual cells angular, 15–25μ diameter, becoming smaller towards the margin, outermost cells brown-walled, even where covered by the gel layer, the remainder hyaline; towards the base this layer merges with the medullary excipulum. Gel layer consisting of straight, long-celled hyphae 2–3μ thick, embedded in a gelatinous matrix, hyphal lumen red in

*Fulbright Research Professor (U.S. Government grant) and a National Science Foundation Senior Postdoctoral Fellow, Yokohama National University, Japan, on sabbatical leave from Cornell University, U.S.A.

KOH-phloxine-glycerine mounts, the whole layer 175–200μ thick below but extending only part way up the flanks of the apothecium and with a gelatinous outer sheath 25–50μ thick which appears granular and stains bright pink in mountant indicated. In Melzer's reagent the gel layer becomes bright blue throughout and the basal part of the medullary excipulum is faintly stained blue; small lengths (3–5μ) of other hyphae also stain deep blue, apparently where they are slightly thickened. Asci 100–120 × 12–15μ, 8-spored, not arising from croziers, the pore clearly outlined blue in Melzer's reagent. Ascospores cylindrical to subfusoid, usually more pointed below and often slightly curved, nonseptate, hyaline, with 2–4 large guttules and many smaller ones, 16·5–20 × 4·5–6·5μ, mostly 18–19 × 5·5–6μ. Paraphyses filiform, 2–2·5μ wide.

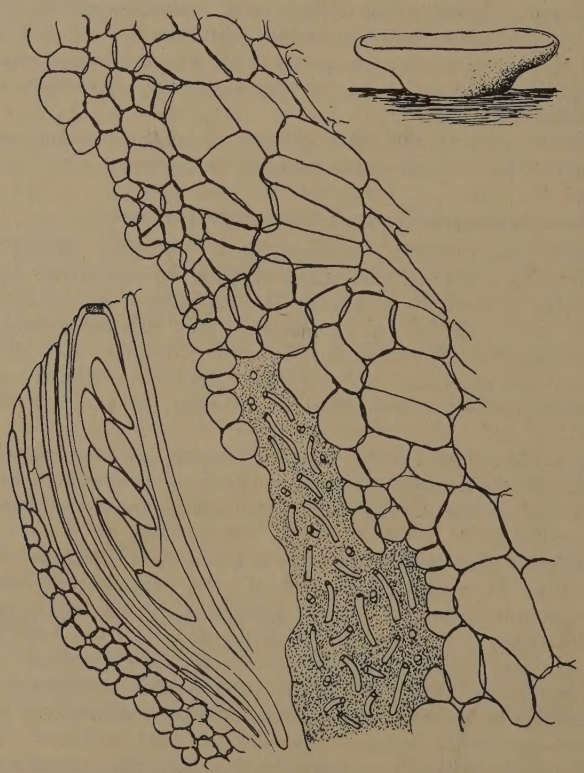


FIG. 1. *Sphagnicola iodocyanescens*. Habit sketch × 10. Sections of margin and ectal excipulum at junction of gelatinised and non-gelatinised zones × 660. Stippled areas in sections turn blue with iodine.

On twigs, leaves, herbaceous stems, etc., in moist areas of a stream bed. Woods around Obama, Unzen National Park, Nagasaki Prefecture, Kyushu, Japan. Leg. S. Imai & R. P. Korf, Fungi of Japan 308. Holotype in Herbar-

ium of the Royal Botanic Gardens, Kew, Isotypes at Cornell University, National Science Museum, Tokyo, and personal herbarium of R. P. Korf.

It is now necessary to propose the following new combination for the second species of *Pseudodiscinella*:

Sphagnicola obstricta (*Karst.*) *Dennis et Korf*, comb. nov.

Peziza obstricta Karst. in Not. Sallsk. pro Fauna et Flora Fennica **10,** 151 (1869).

Ombrophila umbonata (Pers.?) Karst **obstricta* (Karst.) Karst. op. cit. **11,** 243 (1870).

Pseudodiscinella obstricta (Karst.) Dennis in Kew Bull. **1955,** 569 (1956).

This species was described and figured by Dennis in The Irish Naturalists' Journal **11,** 334–335 (1955).

The species of *Sphagnicola* so far studied by us can be distinguished as follows:

A. Superficial gel layer blued by iodine, marginal cilia absent *S. iodocyanescens*

B. Superficial gel layer not blued by iodine:

1. Margin bearing cilia, hyphae of gel layer straight . . *S. ciliifera*

2. Margin glabrous, spiral hyphae present in gel layer . . *S. obstricta*

Another species which it was formerly thought might belong here is *Helotium melleum* Berk. & Br. but further studies of the type collection have shown that this is not so. The material is in poor condition and the structure is hard to recover even in microtome sections but in two apothecia thoroughly examined no gel layer could be found. *Peziza umbonata* Pers., to which Karsten thought his *P. obstricta* was allied, is a species of doubtful interpretation. We have not seen the two species of *Sphagnicola* described as new by Velenovsky, both of which seem to have been quite distinct from *S. iodocyanescens*, nor *Peziza merimaskuensis* Karst, which its author subsequently reduced to a variety of his *Ombrophila ciliifera*.

It should, perhaps, be pointed out that only a single character, the basal gel layer, separates *Sphagnicola* from those fungi like *Helotium melleum, Pachydisca nobilis* (Vel.) Le Gal, *P. umbilicata* Le Gal and *Helotium lutisedum* (Karst.) Karst., in which a solid flesh of compact, thin-walled hyphae, is covered by a thin pseudoparenchymatous ectal excipulum. It is too early to be certain whether the presence of the gel layer is constant under all circumstances. If it is not these species may also be referred to *Sphagnicola*. The genus *Pachydisca* Boud. is not available for them for Madame Le Gal (1953) has shown that its type species, *Helotium guernisaci* Crouan, is a *Rutstroemia*. On the other hand, *Phaeohelotium* Kanouse 1935 only differs from the above group of species in its ascospores slowly turning brown with age, a character of doubtful generic value.

We are indebted to Madame Le Gal for drawing our attention to the appropriate typification of *Sphagnicola* Vel.

Dennis, R. W. G. 1956. Kew Bulletin 1955 pp. 567–569.
Le Gal, M. 1953. Revue de Mycologie 18, pp. 99–102.
Velenovsky, J. 1934. Monographia Discomycetum Bohemiae, Pragae.

Botanical Exploration of Western North America.*—The early history of botanical exploration in Western North America is seen against a background of wars with France, Spain and Mexico, with the Louisiana Purchase in 1803 as the most sharply prominent feature. Botanists followed and were helped by the armies, the fur traders, trappers, pioneer surveyors and boundary commissions.

The story of these men and the hardships they endured while collecting the type specimens which we all now use is splendidly told in this massive book, which is documented with enviable scholarship in the most elaborate American style. The authoress, after an excellent introductory chapter, divides her period into decades and the treatment of each of these begins with a useful summary and an admirable map marking the various collectors' routes with their dates, and concludes with a bibliography. At the end of the volume there is a selected list of the plants mentioned and two maps.

The authoress has drawn freely from the journals and letters of collectors and she does not omit to mention the present whereabouts of their dried specimens. The characters and qualities of these famous botanists emerge with some clarity from the mass of detail she has assembled. We are shocked by the injustice done to Berlandier's reputation and ability, and amused by the painstaking dilettantism of Prince Maximilian of Wied-Neuwied and, above all, we admire more than ever the single-minded courage and efficiency of so many of these men, especially of our great David Douglas, of whom we are astounded to read that the entire cost of his 1824–27 journey, including his remuneration, was under £40. Others of our countrymen were outstanding, for instance Thomas Drummond, and Thomas Nuttall, who was the first trained botanist to cross North America south of the Canadian territories.

Hardly less interesting are the relations, financial and personal, of all these men with the great herbarium botanists, Asa Gray, Torrey and Engelmann, Sir William Hooker and the De Candolles, who were naming and describing the masses of dried specimens with which their rooms were flooded. Each new collection must have forced the taxonomists to change their opinions: 'species are judgments—judgments of variable value, and often very fallible judgments', said Asa Gray. The standards of such sponsors were high, but their view of the difficulties of collecting in unexplored country was sometimes myopic, and they could scold or even almost forget the existence of the man they had sent out into the field.

The purpose of this book, as the authoress admits, is pragmatically linked to scientific botany: it excludes mention of naturalists and explorers who did not collect plant material which, after study and classification by qualified botanists, was to form the foundation of reliable and comprehensive floras. Similarly, it omits all reference to Spanish and French explorers prior to 1790, because their records, though of great historical interest, are 'valueless from the point of view of scientific botany which lays down certain rules to which all plant descriptions must conform'. A short chapter on such scientifically useless figures might still have added finish and charm as a curtain-raiser to this work, which is a precious mine of information most skilfully presented. N. Y. SANDWITH.

* Botanical Exploration of the Trans-Mississippi West, 1790–1850, by Susan Delano McKelvey. The Arnold Arboretum of Harvard University, Jamaica Plain, Massachusetts, 1956. Pages xl + 1144, maps in text and 2 maps in pocket at end. $25.00.